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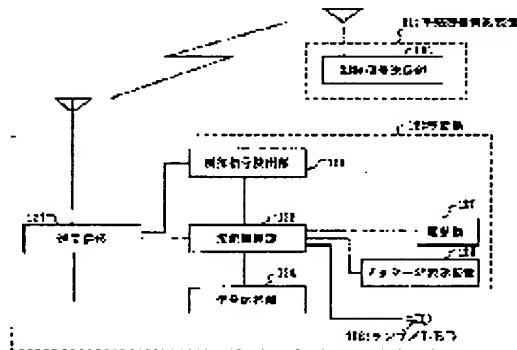
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(21)Application number : 08-277373 (71)Applicant : NEC CORP
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(54) MOBILE COMMUNICATION SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a means that restricts transmission/reception of a mobile set by the other party than the possessor of the mobile set, to indicate to a called party that the call reception is restricted, and to compensate the called party for the unable direct incoming call to an automatic response when an incoming call is received by the mobile set.
SOLUTION: The system is provided with a call transmission/reception restriction device 11 that sends a response message or transfer destination number information together with a control signal to denote restriction of call transmission/reception in an area or a building where call transmission/reception of a mobile set is desired to be restricted, and the mobile set receives the message, detects the control signal among them and avoids connection with respect to a transmission request from the mobile set or an incoming call to the mobile set while the control signal is being received, the mobile set displays a reception state of the control signal to a message display device, or a lamp or an LED 126, and replies automatically that the call reception is restricted when the mobile set receives an incoming call during the reception of the control signal. In the case of the automatic response, the response message received together with the control signal is responded automatically or a transfer destination number received together with the control signal is responded automatically.



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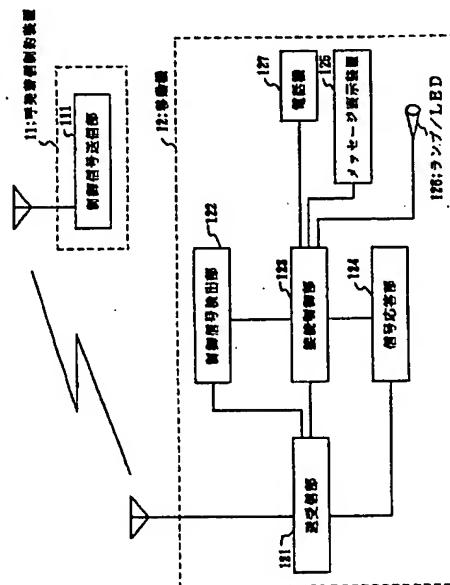
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(54)【発明の名称】 移動通信システム

(57)【要約】

【課題】移動機の所有者以外による移動機の発着信を制約する手段を提供すると共に、着信が制約されていることを被呼者に提示し、移動機に着信があった場合には自動応答して直接着信ができないことに対する補償を行う。

【解決手段】移動機の発着信を制約したい地域あるいは建物において、応答メッセージあるいは転送先番号情報を呼の発着信を制約することを指示する制御信号と共に送信する呼発着信制約装置を設置し、移動機は信号を受信し、その中から前記制御信号を検出し、移動機からの発信要求あるいは移動機への着信に対して前記制御信号を受信中では接続を回避すると共に、メッセージ表示装置あるいはランプあるいはL E Dに前記制御信号受信中であることを表示し、前記制御信号受信中に着信があった場合に呼の着信が制約されていることを自動応答する。自動応答においては、制御信号と共に受信した応答メッセージを自動応答する、あるいは、制御信号と共に受信した転送先番号を自動応答する手段もある。



【特許請求の範囲】

【請求項1】移動携帯電話端末の呼の発着信を制御する範囲内に該移動携帯電話端末が存在する際に、該移動携帯電話端末に対して呼の発着信を制約するための制御信号を発信する手段を配設し、該移動携帯電話端末においては、該制御信号を受信した際に、呼の発着信が制約される共に、該移動携帯電話端末の保持者にその旨を通知し、且つ、着信呼を受けた場合には、呼の着信が制約されている旨を示す信号を自動応答する、ことを特徴とする移動通信システム。

【請求項2】移動通信システムで移動機に対する呼の発着信接続制約及び代替応答の方式において、呼の発着信を制約することを指示する制御信号を送信する制御信号送信手段を有する発着信制約装置を備え、前記移動機が、信号を受信する送受信手段と、受信した信号の中から発着信を制約する制御信号を検出する制御信号検出手段と、電話機より移動機からの発信の指示を受けた場合又は移動機への着信呼を受けた場合に、前記制御信号を受信している状態では、電話機への接続を回避する接続制御手段と、前記制御信号を受信している場合に、被呼者に対して呼の発着信が制約されていることを通知する手段と、前記接続制御手段からの制御に従って移動機への着信呼を受けた場合に、呼の着信が制約されていることを示す信号を自動応答する信号応答手段と、電話機と、を含むことを特徴とする移動通信システム。

【請求項3】前記発着信制約装置が、着信が制約されていることを自動応答する際のメッセージを記憶する送信メッセージ記憶手段と、前記メッセージ及び呼の発着信を制約することを指示する制御信号を送信する制御信号送信手段と、を備え、前記移動機が、自動応答時に送出するメッセージを受信するメッセージ受信手段と、前記メッセージ受信手段が受け取った応答メッセージを記憶する受信メッセージ記憶手段と、を備え、また、前記信号応答手段の代わりに、前記接続制御手段からの制御に従って前記メッセージ記憶手段に記憶されているメッセージを自動応答するメッセージ応答手段と、を備えることを特徴とする請求項2記載の移動通信システム。

【請求項4】前記移動機が、該移動機に着信があった場合に、自動応答するメッセージを登録あるいは削除するメッセージ登録・削除手段と、前記自動応答メッセージを記憶するメッセージ記憶手段と、を備え、

前記信号応答手段の代わりに、前記接続制御手段からの制御に従ってメッセージ記憶手段に記憶されているメッセージを自動応答するメッセージ応答手段を備えることを特徴とする請求項2記載の移動通信システム。

【請求項5】前記発着信制約装置が、

転送先の加入者番号を記憶する転送先番号記憶手段と、前記転送先番号及び呼の発着信を制約することを指示する制御信号を送信する制御信号送信手段と、を備え、

10 前記移動機が、自動応答時に送出する転送先の加入者番号を受信する転送先番号受信手段と、受け取った転送先の加入者番号を記憶する転送先番号記憶手段と、を備え、前記信号応答手段は、前記接続制御手段からの制御に従って前記転送先番号記憶手段に記憶されている転送先の加入者番号を自動応答し、さらに、転送先加入者番号を受信する転送先受信記憶部と、

20 前記転送先番号に基づき呼接続の変更を制御する呼接続制御手段と、呼の接続・切り替えを行う交換スイッチと、を含む交換機を、備える、ことを特徴とする請求項2記載の移動通信システム。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、移動通信システムにおいて、呼の発着信接続の制約及び代替応答の方式に関する、特に移動機使用者の意志にかかわりなく、その地域あるいは建物の管理者によって制御を行う方式に関する。

【0002】

【従来の技術】着信制御の従来技術として、例えば特開平2-67829号公報には、携帯無線電話端末所有者が自身の携帯無線電話端末に対して着信制御を行えるようになると、発呼側が緊急呼である旨の意志表示を行った場合には、着信規制を解除し、着信が可能となるようにして携帯電話の利便性を向上する方式が提案されており、被呼者が移動機から接続される構内交換機に対して着信規制を指示及び解除する方式、また、緊急呼に対しては接続を許容する方式が記載されている。

【0003】一方、着信制御した場合の救済の従来の方法として、着信制御されている状況での転送方式が、例えば特開平4-347996号公報に示されている。図13にその構成を示すが、着信転送機能が設定されている状態において、被呼者の移動機に対する着信を転送先の移動機に着信させる第1の着信制御モードと、被呼者の移動機に対する着信を該移動機に直接着信させる第2の着信制御モードを選択的に切り替える。着信移動機の使用者本人の意志により、会議中の着信をアシスタント

の移動機に着信させ、また、会議の休憩時間等のような自由時間には本人の移動機へ着信させる選択的な着信転送機能を提供するものである。

【0004】すなわち、図13において、LCH1300はBSインターフェース部1301、制御部1302、メモリ部1303、PBXインターフェース部1304から構成される。BSインターフェース部1301は、親機BS1305～1307と有線接続される。制御部1302は、親機BSを介して子機PSとPBX1320との接続と、それぞれの親機BSを介して異なる親機BSのゾーンにある子機PS間の接続とを行う接続制御部1302A、メモリ部1303を制御するメモリ制御部1302Bから構成される。メモリ部1303は、子機PSとダイヤルイン番号との対応を記憶する第1エリア1303A、各PSがどのBSのゾーンにあるのかを記憶する第2エリア1303B、着信転送モードを設定した子機PSと転送先子機PSとの対応と、着信転送モードを設定した子機PSがどちらのモードにあるのかを示す転送フラグとを記憶する第3エリア1303C、子機PSが着信を転送するモードにある時、LCUが着信を転送先子機PSへ転送する件数の累積カウント値を記憶する第4エリア1303Dを備えて構成される。

【0005】PBXインターフェース部1304は、PBX1320と接続される。PBX1320は、一般公衆網1330と接続される。また、親機BS1305のゾーンZ1には子機PS1308～1310があり、親機BS1306のゾーンZ2には子機PS1311～1312があり、親機BS1307のゾーンZ3には子機PS1313～1314がある。

【0006】また代替応答の従来技術として、例えば特開平4-216221号公報には、被呼者の運転状況を移動機が検出して、自動的に着信応答保留信号を出し、無線基地局は以降の通信を保留するという方式が示されている。同公報には、被呼者の意志にかかわりなく代替応答制御が行われる。

【0007】さらに代替応答の従来技術として、例えば特開平5-122757号公報において、移動機が応答できない状態にある場合の、発呼者の通信内容を該移動局に伝達する方式が示されている。図14に、その構成例を示す。図14を参照すると、基地局は、移動機自体の応答状態を記憶する移動機状態記憶手段1417と、前記移動機以外からの発呼に対し、移動機状態記憶手段1417により記憶された移動機自体の状態が応答不可である場合又は前記移動機間の無線通信回線が構成できない場合に自動応答する自動応答手段1413と、自動応答後に、発呼者からの通信情報を記憶する記憶手段1414と、前記記憶手段による記憶終了後に、前記移動機間の無線通信回線が構成できる場合に前記記憶された通信情報を前記移動機に転送する転送手段145とを具備し、前記移動機が、自移動機の応答状態を基地局に通

知する応答通知手段と、前記転送手段から転送された通信情報を記憶する転送通信情報記憶手段1424と、前記転送通信情報記憶手段による転送通信情報の記憶終了時に、前記移動機使用者に着信を通知する着信通知手段と、前記記憶された転送通信情報を出力する出力手段を具備する。

【0008】

【発明が解決しようとする課題】上記した従来技術は、下記記載の問題点を有している。

10 【0009】(1) 第1の問題点は、従来の技術では、移動機を所有する被呼者以外の人によって着信を制約することができない、ということである。

【0010】従来、移動通信システムにおいて、受信移動機は呼の着信時リング（鳴動）により被呼者に通知する方式をとっている。被呼者は、受信したくない場合移動機の電源を切ることにより、着信を制約することができるが、ホテル、レストラン、病院等の特定の建物内において、建物等の管理者が呼の着信を制約したい場合に対して手段がなかった。また、振動による着信を通知する方式もあるが、通話そのものが被呼者周辺の他の迷惑となるために制約することが好ましい場合においても、前記管理者は口頭で個別に注意する以外に手段を持たなかった。特開平4-347996号公報及び特開平2-67829号公報に記載の従来技術では、被呼者自身の意志でしか制御できない点が問題である。

20 【0011】その理由は、移動通信システムを利用する加入者の利便性の向上のみに着目し、利用者の周囲の人達や環境に対しての配慮が欠如し、対策が講じられなかったことが原因である。

30 【0012】(2) 第2の問題点は、前記第1の問題点の理由と同様にして、移動機を所有する加入者以外の人によっては、移動機からの発信を制約できない、ということである。このため、例えば病院等において医療機器の誤動作の問題に対して、使用者への依頼に依るしか手段がない。

【0013】(3) 第3の問題点は、着信が制約されていることに対する補償が十分になされていない、ということである。

40 【0014】被呼者の意志に無関係に着信が制約された場合、着信が制約されていることを被呼者が確認できる手段が提供されていない。上記特開平4-216221号公報に記載の従来技術においては、無線基地局からは発信者に対して音声で通知がなされるのみで、着信応答保留時の着信呼に対して被呼者は直接知る手段を欠いている。また、上記特開平5-122757号公報記載の従来技術では、基地局における記憶手段により応答可能となった時点で通信内容を含めて確認できるが、緊急を要する着信呼に対しては救済手段がない。

【0015】その理由は、着信呼が制約されることに対する補償の考え方方が十分ではなかったためと考えられ

る。

【0016】(4) 第4の問題点は、基本的な制御が交換機あるいは無線基地局で行われる方式になっている、ということである。特に、上記特開平4-347996号公報の記載の従来技術では、転送先を含む移動機が同一の交換機に接続されていることが前提となっている。このため、複数の交換機あるいは無線基地局にまたがる場合の機能の提供に問題がある。

【0017】その理由は、移動機の処理の負担を軽減し、コスト及び重量の低減を重視していることによる。

【0018】したがって、本発明は、上記問題点に鑑みてなされたものであって、その目的は、移動機を所有する被呼者の意志に依らず、被呼者以外の特定の地域あるいは建物の管理者に対して、移動機からの発信及び移動機への着信を制約することを可能とする、移動通信システムを提供することにある。

【0019】本発明の他の目的は、発着信が制約されていることを被呼者に対して通知する手段を提供すると共に、着信呼に対して代替応答の手段を提供し、移動機への直接の着信が制約されていることに対する補償手段を備えた移動通信システムを提供することにある。

【0020】本発明のさらに他の目的は、基本的な制御を移動機で行い、また、発着信規制を行う当該地域あるいは建物において行うことを可能とした移動通信システムを提供することにある。

【0021】

【課題を解決するための手段】前記目的を達成するため、本発明の移動通信システムは、移動機に対する呼の発着信接続制約及び代替応答の方式では、呼の発着信を制約することを指示する制御信号を送信する制御信号送信手段を有する発着信制約装置を備え、信号を受信する送受信手段と、受信した信号の中から発着信を制約する制御信号を検出する制御信号検出手段と、電話機より移動機からの発信の指示を受けた場合あるいは移動機への着信呼を受けた場合に前記制御信号を受信している状態では電話機への接続を回避する接続制御手段と、前記制御信号を受信している場合に被呼者に対して呼の発着信が制約されていることを通知するメッセージ表示装置あるいはランプまたはLEDと、前記接続制御手段からの制御に従って移動機への着信を受けた場合に呼の着信が制約されていることを示す信号を自動応答する信号応答手段、及び、電話機を含む移動機を備えることを特徴とする。

【0022】本発明は、前記発着信制約装置は、着信が制約されていることを自動応答する際のメッセージを記憶する送信メッセージ記憶手段と、前記メッセージ及び呼の発着信を制約することを指示する制御信号を送信する制御信号送信手段を備え、また、前記移動機は、自動応答時に送出するメッセージを受信するメッセージ受信手段、メッセージ受信手段が受け取った応答メッセージ

を記憶する受信メッセージ記憶手段を備え、また、前記信号応答手段の代わりに接続制御手段からの制御に従ってメッセージ記憶手段に記憶されているメッセージを自動応答するメッセージ応答手段を備えることを特徴とする。

【0023】また、本発明は、前記移動機は、該移動機に着信があった場合に自動応答するメッセージを登録あるいは削除するメッセージ登録・削除手段、前記自動応答メッセージを記憶するメッセージ記憶手段を備え、また、前記信号応答手段の代わりに接続制御手段からの制御に従ってメッセージ記憶手段に記憶されているメッセージを自動応答するメッセージ応答手段を備えることを特徴とする。

【0024】さらに、本発明は、前記発着信制約装置は、転送先の加入者番号を記憶する転送先番号記憶手段と、前記転送先番号及び呼の発着信を制約することを指示する制御信号を送信する制御信号送信手段を備え、また、前記移動機は、自動応答時に送出する転送先の加入者番号を受信する転送先番号受信手段、受け取った転送先の加入者番号を記憶する転送先番号記憶手段を備え、また、前記信号応答手段では接続制御手段からの制御に従って前記転送先番号記憶手段に記憶されている転送先の加入者番号を自動応答する信号応答手段を備え、さらに、転送先加入者番号を受信する転送先番号受信記憶部、前記転送先番号に基づき呼接続の変更を制御する呼接続制御手段、及び、呼の接続・切り替えを行う交換スイッチを含む交換機を、備える、ことを特徴とする。

【0025】

【発明の実施の形態】本発明の実施の形態について以下に説明する。本発明は、好ましい実施の形態において、呼の発着信を制約することを指示する制御信号を送信する制御信号送信部を有する発着信制約装置（図1の1-1）を備え、移動機（図1の1-2）は、信号を受信する送受信部（図1の1-2-1）と、受信した信号の中から発着信を制約する制御信号を検出する制御信号検出部（図1の1-2-2）と、電話機（図1の1-2-7）より移動機からの発信の指示を受けた場合あるいは移動機への着信呼を受けた場合に、制御信号を受信している状態では、電話機（図1の1-2-7）への接続を回避する接続制御部（図1の1-2-3）と、制御信号を受信している場合に、被呼者に対して呼の発着信が制約されていることを通知する手段（図1の1-2-5及び1-2-6）と、接続制御部（図1の1-2-3）からの制御に従って移動機への着信呼を受けた場合に、呼の着信が制約されていることを示す信号を自動応答する信号応答部（図1の1-2-4）と、電話機（図1の1-2-7）と、を備えて構成される。

【0026】ホテル、レストラン、病院等において、移動機による通話を制約したい場合、それらの管理者は、移動機からの発信及び移動機への着信を制約することを

指示するための制御信号を送信する発着信制約装置（図1の11）を、この制御信号を移動機が受信できるように1又は複数設置する。

【0027】被呼者が、移動機を持って発着信接続が制約されている、地域あるいは建物の中にはいると、移動機（図1の12）は、当該地域あるいは建物に1又は複数設置されている発着信制約装置（図1の11）から発信される呼の発着信を制約することを指示する制御信号を、送受信部にて受信する。

【0028】制御信号検出部（図1の122）では、送受信部で受信した信号の中から前記制御信号を検出し、接続制御部（図1の123）に対して、該制御信号を受信していることを通知する。

【0029】接続制御部（図1の123）は、前記制御信号を受信していることを通知されている状態では、移動機のメッセージ表示装置（図1の125）に、呼の発着信が制約されていることを通知するメッセージを表示する、あるいはランプまたはLED（図1の126）を点灯させ、被呼者に対して呼の発着信が制約されていることを通知する。

【0030】接続制御部（図1の123）は、前記制御信号を受信していることを通知されている状態において、呼の着信があった場合、電話機（図1の127）への接続を回避し、これにより着信を制約する。

【0031】さらに、接続制御部（図1の123）は、信号応答部（図1の124）に指示し、信号応答部（図1の124）は、呼の着信が制約されていることを示す、予め定められた、信号を自動応答する。

【0032】また、接続制御部（図1の123）は、制御信号を受信していることを通知されている状態において、電話機（図1の127）からの呼の発信の指示を受けた場合、送信部（図1の121）への接続を回避し、呼の発信を制約する。

【0033】次に、本発明は、好ましい第2の実施の形態において、移動機の発着信を制御するための信号を送信する発着信制約装置（図2の21）は、着信が制約されていることを自動応答する際のメッセージを記憶する送信メッセージ記憶部（図2の212）を有し、呼の着信の制約を指示する制御信号と共に制御信号送信部（図2の211）から送信メッセージ記憶部（図2の212）に記憶される自動応答する際のメッセージを送信する。

【0034】移動機（図2の22）は、送受信部（図2の221）にて、制御信号と共に、前記自動応答する際のメッセージを受信する。応答メッセージ受信部（図2の226）は、受信信号から自動応答する際のメッセージを取り出し、応答メッセージ記憶部（図2の225）に記憶させる。接続制御部（図2の223）は、制御信号を受信していることを通知されている状態において、呼の着信があった場合、電話機（図2の227）への接

続を回避すると共に、メッセージ応答部（図2の224）に自動応答することを指示する。

【0035】メッセージ応答部（図2の224）は、接続制御部（図2の223）からの自動応答に指示を受けると、応答メッセージ記憶部（図2の225）から記憶されている前記自動応答する際のメッセージを読み出し、送受信部（図2の221）を経由して送信する。

【0036】また、本発明は、好ましい第3の実施の形態において、移動機（図3の32）は、該移動機に着信

があった場合に自動応答するメッセージを登録あるいは削除する手段としてメッセージ登録・削除部（図2の326）を備え、メッセージ記憶部（図3の325）に記憶させる着信が制約されていることを自動応答する際のメッセージを、被呼者が独自に指定することができる。

【0037】また、本発明は、好ましい第4の実施の形態において、発着信制約装置（図4の41）は、転送先の加入者番号を記憶する転送先番号記憶部（図4の412）を有し、呼の発着信を制約する制御信号と共に、転送先番号記憶部（図4の412）に記憶される転送先番号の情報を制御信号送信部（図4の411）から送信する。

【0038】移動機（図4の42）は、送受信部（図4の421）で制御信号と共に転送先番号の情報を受信する。転送先番号受信部（図4の426）において、転送先番号の情報を取り出し、転送先番号記憶部（図4の425）に記憶する。

【0039】信号応答部（図4の424）は、接続制御部（図4の423）からの自動応答の指示を受けると、転送先番号記憶部（図4の425）から記憶されている前記転送先の加入者番号の情報を読み出し、送受信部（図4の421）を経由して送信する。

【0040】交換機（図4の43）は、前記応答信号を受信すると、転送先の加入者番号を転送先番号受信レジスタ（図4の431）に記憶する。次に、呼接続制御部（図4の432）は、当該転送先番号へ着信呼の接続を切り替える。

【0041】

【発明の実施の形態】上記した本発明の実施の形態について更に詳細に説明すべく、本発明の実施例について、図面を参照して以下に詳細に説明する。

【0042】

【実施例1】図1は本発明の最も基本的な実施例の構成を示した図である。図1を参照すると、本発明の実施例は、移動機の発着信を制約することを指示する制御信号を発信する制御信号送信部111を有する呼発着信制約装置11を備え、移動機12は、信号を受信する送受信部121、制御信号を受信しているか否かを検出する制御信号検出部122と、移動機からの呼の発信の指示を受けた場合あるいは移動機への着信呼を受けた場合に、制御信号を受信している状態では、電話機への接続を回

避する接続制御部123と、接続制御部123からの制御に従って呼の着信が制約されていることを示す信号を自動応答する信号応答部124と、呼の発着信が制約されていることを示すメッセージ表示装置あるいはランプまたはLED126と、電話機127と、を備えて構成される。

【0043】次に、本発明の実施例の動作について、図1、及び図5～図7の流れ図を参照して詳細に説明する。

【0044】初めに、図5を参照して、本実施例において、呼の発着信が制約されていることの検出動作を説明する。

【0045】被呼者が移動機12を持って発着信接続が制約されている地域あるいは建物の中に入ると、移動機12は、当該地域あるいは建物に設置されている発着信制約装置11の制御信号送信部111から発信される、呼の発着信を制約することを指示する、制御信号を送受信部121で受信する（ステップ51）。

【0046】制御信号検出部122では、送受信部121で受信した信号の中から、呼の発着信を制約することを指示する制御信号の有無を判別し（ステップ52）、制御信号を検出した場合には、接続制御部123に該制御信号を受信していることを通知する（ステップ53）。

【0047】接続制御部123は、制御信号を受信していることを通知されている状態では、移動機12のメッセージ表示装置126に呼の発着信が制約されていることを通知するメッセージを表示する、あるいは、ランプまたはLED126を点灯させ、被呼者に対して呼の発着信が制約されていることを通知する（ステップ54）。

【0048】次に、本実施例において、呼の発着信が制約されている場合に、呼の発信要求を受けた場合の動作について図6を参照して説明する。

【0049】接続制御部123は、電話機127からの呼の発信の指示を受けた場合（ステップ61）、呼の発着信を制約する制御信号を受信していることが通知されている状態にあるか否かを判別する（ステップ62）。

【0050】この制御信号を受信していない場合には、接続制御部123は電話機127と送受信部121を接続し、移動機12からの呼の発信を許容する（ステップ63）。

【0051】一方、該制御信号を受信している場合は、接続制御部123は電話機127と送受信部121を接続せず、呼の発信を許容しない（ステップ64）。

【0052】次に、本発明の実施例において、呼の発着信が制約されている場合に、呼の着信があった場合の動作について図7を参照して説明する。

【0053】接続制御部123は、呼の着信を検知すると（ステップ71）、呼の発着信を制約する制御信号を

受信していることを通知されている状態にあるか否かを判別する（ステップ72）。

【0054】制御信号を受信していない場合には、接続制御部123は電話機127と送受信部121を接続し、移動機12からの呼の着信を許容する（ステップ73）。

【0055】一方、上記制御信号を受信している場合には、接続制御部123は電話機127と送受信部121を接続せず、呼の着信を許容しない（ステップ74）。

【0056】さらに、接続制御部123は、信号応答部124に自動応答することを指示し（ステップ75）、信号応答部124は呼の着信が制約されていることを示す予め定められた信号を送受信部に送る（ステップ76）。

【0057】

【実施例2】本発明の第2の実施例について図2を参照して説明する。

【0058】図2を参照すると、本実施例は、着信が制約されていることを自動応答する際のメッセージを記憶する送信メッセージ記憶部212と、送信メッセージ記憶部に記録されているメッセージ及び移動機への着信を制約することを指示する信号を発信する制御信号送信部211を含む発着信制約装置21を備え、移動機22は、信号を受信する送受信部221と、制御信号を受信しているか否かを検出する制御信号検出部222と、移動機からの呼の発信の指示を受けた場合あるいは移動機への着信呼を受けた場合に、制御信号を受信している状態では、電話機への接続を回避する接続制御部223と、自動応答時に送出するメッセージを受信する応答メッセージ受信部226と、応答メッセージ受信部226が受け取った応答メッセージを記憶する応答メッセージ記憶部225と、接続制御部223からの制御に従って応答メッセージ記憶部225に記憶されているメッセージを自動応答するメッセージ応答部224と、電話機227と、を備えて構成される。

【0059】次に、本実施例の動作について、図2、及び図8～図9を参照して詳細に説明する。

【0060】初めに、図8を参照して、呼の発着信が制約されていることの検出と同時に呼の着信が制約されていることを応答する自動応答メッセージの受信動作を説明する。図8において、ステップ81～83は、図5のステップ51～53に各々対応するので、ここではその説明を省略する。

【0061】ステップ83の後、制御信号検出部222は応答メッセージ受信部226に該制御信号を受信中であることを通知すると共に、受信信号を応答メッセージ受信部226に送る（ステップ84）。

【0062】応答メッセージ受信部226は、制御信号検出部222から該制御信号が受信中である通知を受けると、呼の着信が制約されていることを通知するための

自動応答メッセージを受信信号の中から取り出し、応答メッセージ記憶部に記憶させる（ステップ85）。

【0063】次に、呼の発着信が制約されている場合に、呼の着信があった場合の動作を図9を参照して説明する。図9において、ステップ91～94は、図7のステップ71～74に各々対応するので、ここでは説明を省略する。

【0064】ステップ94の後、接続制御部223は、メッセージ応答部224に自動応答することを指示し（ステップ95）、メッセージ応答部224は応答メッセージ記憶部225から記憶されている自動応答するメッセージを読み出し、送受信部に送る（ステップ96）。

【0065】呼の発着信が制約されている場合に、呼の発信要求を受けた場合の動作は第1の発明の実施の形態の図6の場合と同様であるので、その説明を省略する。

【0066】

【実施例3】次に本発明の第3の実施例について図3を参照して説明する。

【0067】図3を参照すると、本実施例は、移動機の発着信を制約することを指示する信号を発信する制御信号送信部311を有する呼発着信制約装置31を備え、移動機32は、信号を受信する送受信部321、制御信号を受信しているか否かを検出する制御信号検出部322と、移動機からの呼の発信の指示を受けた場合あるいは移動機への着信呼を受けた場合に前記制御信号を受信している状態では電話機への接続を回避する接続制御部323と、移動機に着信があった場合に自動応答するメッセージを登録あるいは削除するメッセージ登録・削除部326と、自動応答メッセージを記憶するメッセージ記憶部325と、接続制御部323からの制御に従って予めメッセージ記憶部325に記憶されているメッセージを自動応答するメッセージ応答部324と、電話機327と、を備えて構成される。

【0068】本実施例の動作については、呼の発着信が制約されることの検出動作は、前記第1の実施例の動作を示す図5と同様であり、呼の発着信が制約されている場合に呼の発信要求を受けた場合の動作は、前記第1の実施例の図6の場合と同様であり、また、呼の発着信が制約されている場合に呼の着信があった場合の動作は、前記第2の実施例の図9の場合と同様であるので、ここでは説明を省略する。

【0069】

【実施例4】次に本発明の第4の実施例について図4を参照して説明する。

【0070】図4を参照して、本実施例は、転送先の加入者番号を記憶する転送先番号記憶部412と、転送先番号記憶部412に記録されている加入者番号及び移動機の発着信を制約することを指示する信号を発信する制御信号送信部411を含む呼発着信制約装置41を備

え、移動機42は、信号を受信する送受信部42と1、制御信号を受信しているか否かを検出する制御信号検出部422と、移動機からの呼の発信の指示を受けた場合あるいは移動機への着信呼を受けた場合に前記制御信号を受信している状態では電話機への接続を回避する接続制御部423と、自動応答時に送出する転送先の加入者番号を受信する転送先番号受信部426と、転送先番号受信部426が受け取った加入者番号を記憶する転送先番号記憶部425と、接続制御部423からの制御に従って転送先番号記憶部425に記憶されている番号を自動応答する信号応答部424と、電話機427と、を備えて構成され、さらに、転送先加入者番号を受信する転送先番号受信レジスタ431と、前記転送先番号に基づき呼接続の変更を制御する呼接続制御部432と、呼の接続・切り替えを行う交換スイッチ433と、を含む交換機43を備えている。

【0071】次に、本発明の実施例について、図4、及び図10～図12を参照して詳細に説明する。

【0072】初めに、図10を参照して、呼の発着信が制約されていることの検出と同時に呼の着信が制約されている場合の転送先情報を受信する動作を説明する。なお、図10のステップ101～103は、図5のステップ51～53に各々対応しており（前記第1の実施例の説明参照）、その説明を省略する。

【0073】ステップ103の後、制御信号検出部422は転送先番号受信部426に該制御信号を受信中であることを通知すると共に、受信信号を転送先番号受信部426に送る（ステップ104）。

【0074】転送先番号受信部426は、制御信号検出部422から該制御信号が受信中である通知を受けると、転送先番号の情報を受信信号の中から取り出し、転送先番号記憶部425に記憶させる（ステップ105）。

【0075】次に、呼の発着信が制約されている場合に、呼の着信があった場合の移動機42での動作を図11を参照して説明する。なお図11のステップ111～114は、図7のステップ71～74に各々対応するので、その説明を省略する。

【0076】ステップ114の後、接続制御部423は、信号応答部424に自動応答することを指示し（ステップ115）、信号応答部424は転送先番号記憶部425から記憶されている転送先番号の情報を読み出し、送受信部に送る（ステップ116）。

【0077】次に、呼の発着信が制約されている場合に、呼の着信があった場合の移動機42での自動応答後の交換機43での動作を図12を参照して説明する。

【0078】交換機43は、移動機42からの呼の着信が制約されていることを通知する応答信号を受信すると、その中から転送先番号の情報を取り出し、転送先番号受信レジスタ431に記憶する（ステップ121）。

【0079】呼接続制御部432は、転送先番号受信レジスタ131に記憶されている転送先番号の情報を読み出し、発信呼の接続を転送先番号の情報に従って切り替えるよう交換スイッチ433を制御する（ステップ122）。交換スイッチ433は、呼接続制御部422の制御に従って、発信呼の接続を切り替える（ステップ123）。

【0080】呼の発着信が制約されている場合に、呼の発信要求を受けた場合の動作は第1の発明の実施の形態の図6の場合と同様であるので、ここでは説明を省略する。

【0081】

【発明の効果】以上説明したように、本発明によれば下記記載の効果を奏する。

【0082】（1）本発明の第1の効果は、移動機を所有する被呼者の意志に依らずに、被呼者以外の特定の地域あるいは建物の管理者が、移動機からの発信及び移動機への着信を制約可能とする、ということである。この結果、管理者は他の利用者の迷惑とならないような環境を維持することができる、という利点を有する。

【0083】その理由は、本発明においては、移動機が、当該地域あるいは建物の管理者が設置する呼発着信制約装置から発信される制御信号を受信し、この制御信号受信中においては移動機からの発信及び移動機への着信を制約するためである。

【0084】（2）本発明の第2の効果は、移動機からの発信及び移動機への着信が制御されていることを移動機を所有する被呼者が確認できる、ということである。

【0085】その理由は、本発明においては、制御信号受信中において、移動機はメッセージ表示装置に制約されていることを示すメッセージを表示、あるいは、予め定めたランプあるいはLEDを点灯あるいは消灯することで、被呼者が発信及び着信が制御されていることを確認できる、ようにしことにによる。

【0086】（3）本発明の第3の効果は、移動機への着信が制約されている場合、着信呼に対して代替応答の手段が用意されており、緊急の着信に対しても、被呼者への補償手段を確保することができる、ということである。

【0087】その理由は、本発明においては、移動機への着信が制約されている状況で着信があった場合、制約中であることを応答する手段のみでなく、代替の電話番号を音声あるいは信号情報により応答する手段を備えたことによる。さらに、本発明においては、前記代替応答の電話番号は、被呼者本人が指定する手段が用意されている。あるいは、当該地域あるいは建物の管理者が予め定めたホテルのフロントやレストランのキャッシャー等の代替の電話番号を、制御信号と共に移動機が受信し、記憶するように構成したこともその理由である。

【0088】（4）本発明の第4の効果は、本発明によ

る制御が、複数の交換機にまたがった地域においても適用可能であることである。

【0089】その理由は、本発明においては、基本的な制御が移動機及び発着信規制を行う地域あるいは建物に設置する呼発着信制約装置のみで実現できるためである。

【図面の簡単な説明】

【図1】本発明の最も基本的な第1の実施例の構成を示すブロック図である。

10 【図2】本発明の第2の実施例の構成を示すブロック図である。

【図3】本発明の第3の実施例の構成を示すブロック図である。

【図4】本発明の第4の実施例の構成を示すブロック図である。

【図5】本発明の第1の実施例における呼の発着信が制約されていることの検出動作を示すフローチャートである。

20 【図6】本発明の第1の実施例における呼の発着信が制約されている場合に呼の発信要求を受けた場合の動作を示すフローチャートである。

【図7】本発明の第1の実施例における呼の発着信が制約されている場合に呼の着信があった場合の動作を示すフローチャートである。

【図8】本発明の第2の実施例における呼の発着信が制約されていることの検出と同時に呼の着信が制約されていることを応答する動作を示すフローチャートである。

30 【図9】本発明の第2の実施例における呼の発着信が制約されている場合に呼の着信があった場合の動作を示すフローチャートである。

【図10】本発明の第4の実施例における呼の発着信が制約されていることの検出と同時に呼の着信が制約されている場合の転送先情報を受信する動作を示すフローチャートである。

【図11】本発明の第4の実施例における呼の発着信が制約されている場合に呼の着信があった場合の動作を示すフローチャートである。

40 【図12】本発明の第4の実施例における呼の発着信が制約されている場合に移動機で自動応答した後の交換機での動作を示すフローチャートである。

【図13】従来の移動通信システムの構成の一例を示すブロック図である。

【図14】従来の移動通信システムの他の構成の一例を示すブロック図である。

【符号の説明】

Z1～Z3 ゾーン

1 1 呼発着信制約装置

1 2 移動機

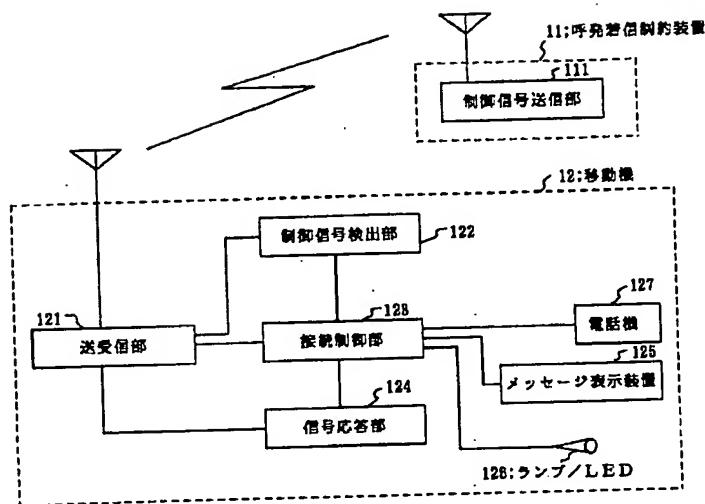
2 1 呼発着信制約装置

2 2 移動機

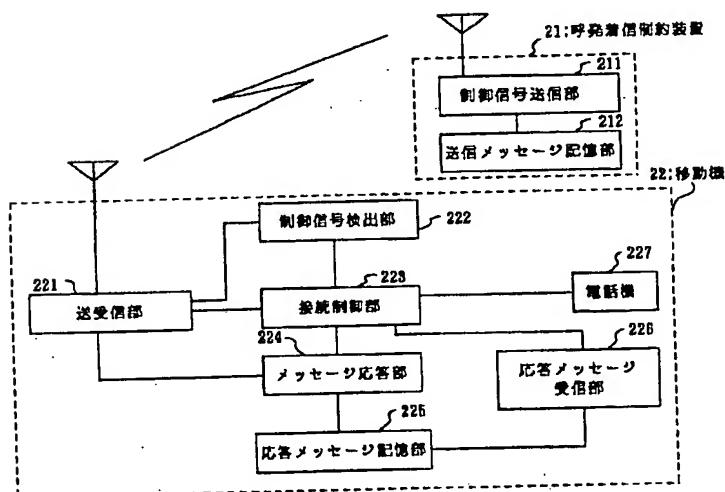
3 1 呼発着信制約装置
 3 2 移動機
 4 1 呼発着信制約装置
 4 2 移動機
 4 3 交換機
 1 1 1 制御信号送信部
 1 2 1 送受信部
 1 2 2 制御信号検出部
 1 2 3 接続制御部
 1 2 4 信号応答部
 1 2 5 メッセージ表示装置
 1 2 6 ランプ／LED
 1 2 7 電話機
 1 4 1 電話交換網
 1 4 2 基地局
 1 4 3 移動電話機
 1 4 4 一般電話機
 1 4 5、1 4 6 制御部
 2 1 1 制御信号送信部
 2 1 2 送信メッセージ記憶部
 2 2 1 送受信部
 2 2 2 制御信号検出部
 2 2 3 接続制御部
 2 2 4 メッセージ応答部
 2 2 5 応答メッセージ記憶部
 2 2 6 応答メッセージ受信部
 2 2 7 電話機
 3 1 1 制御信号送信部
 3 2 1 送受信部
 3 2 2 制御信号検出部
 3 2 3 接続制御部
 3 2 4 メッセージ応答部
 3 2 5 メッセージ記憶部
 3 2 6 メッセージ登録・削除部
 3 2 7 電話機
 4 1 1 制御信号送信部
 4 1 2 転送先電話記憶部
 4 2 1 送受信部

4 2 2 制御信号検出部
 4 2 3 接続制御部
 4 2 4 信号応答部
 4 2 5 転送先番号記憶部
 4 2 6 転送先番号受信部
 4 2 7 電話機
 4 3 1 転送先番号受信レジスタ
 4 3 2 呼接続制御部
 4 3 3 交換スイッチ
 10 1 3 0 0 LCU
 1 3 0 1 B S インタフェース部
 1 3 0 2 制御部
 1 3 0 2 A 接続制御部
 1 3 0 2 B メモリ制御部
 1 3 0 3 メモリ部
 1 3 0 3 A 第1のエリア
 1 3 0 3 B 第2のエリア
 1 3 0 3 C 第3のエリア
 1 3 0 3 D 第4のエリア
 20 1 3 0 4 PBX インタフェース部
 1 3 0 5～1 3 0 7 親機
 1 3 0 8～1 3 1 1 子機
 1 3 2 0 PBX
 1 3 3 0 一般公衆網
 1 4 1 1、1 4 2 1 通話回線
 1 4 1 2、1 4 2 2 R F 変・複調回路
 1 4 1 3 自動応答回路
 1 4 1 4、1 4 2 4 録音回路
 1 4 1 5、1 4 2 5 モデム
 30 1 4 1 6、1 4 2 6 I D メモリ
 1 4 1 7 移動電話機状態記憶メモリ
 1 4 2 3 着信表示部
 1 4 2 7 応答状態スイッチ
 1 4 2 8 再生スイッチ
 1 4 2 9 消去スイッチ
 1 4 3 0 送話器
 1 4 3 1 受話器

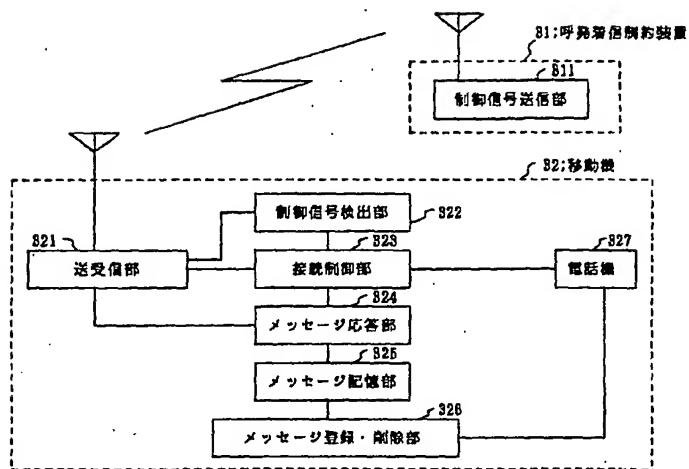
【図1】



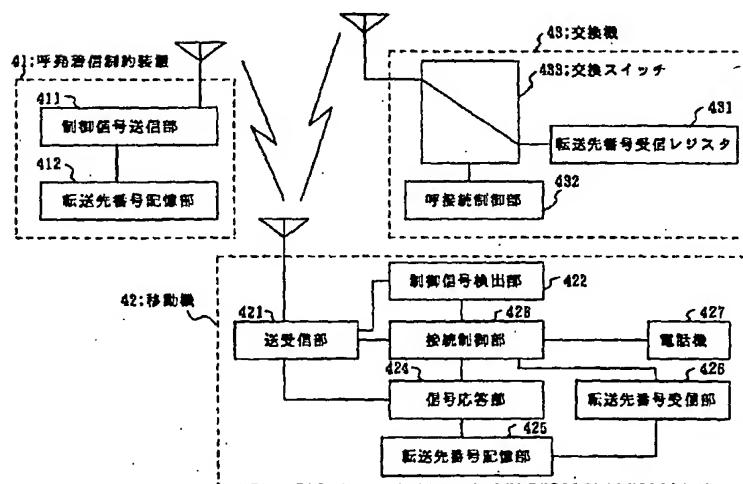
【図2】



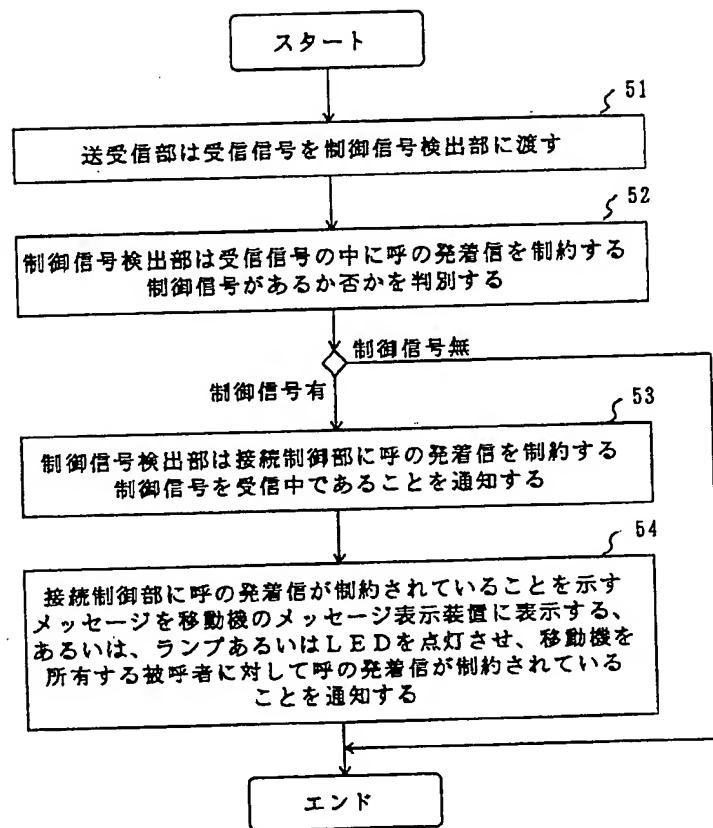
【図3】



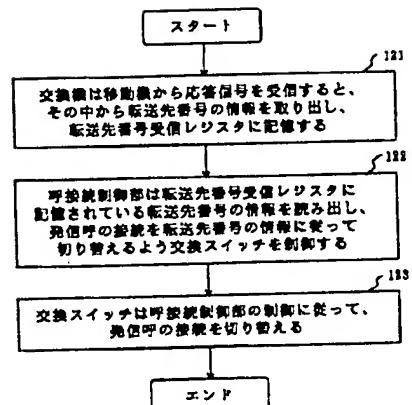
【図4】



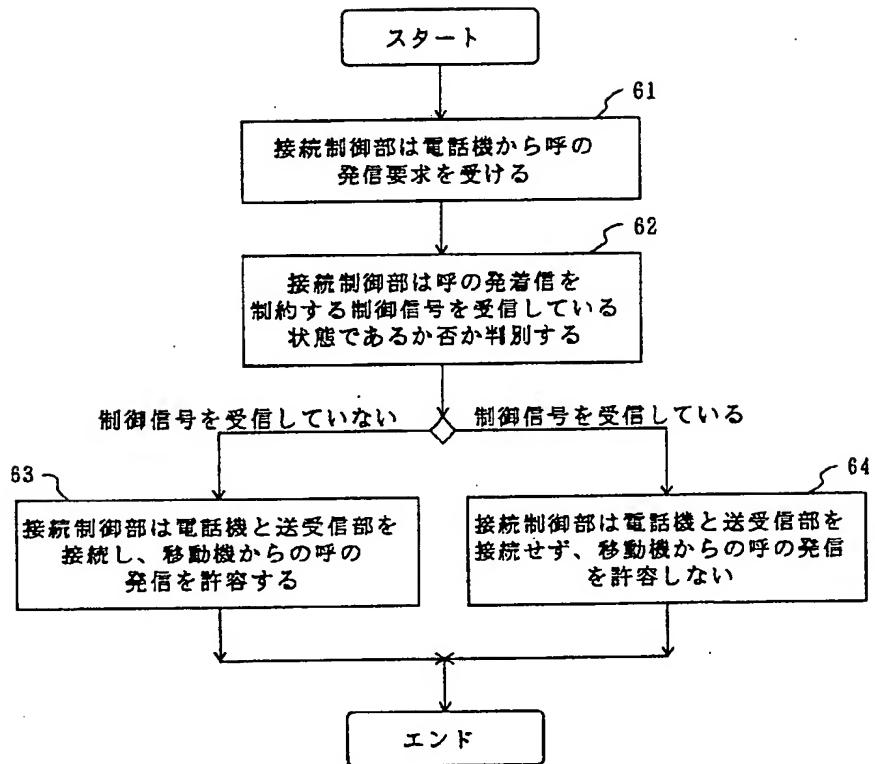
【図5】



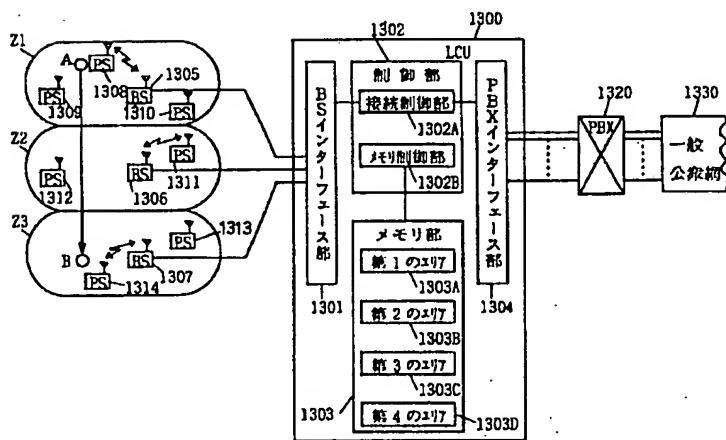
【図12】



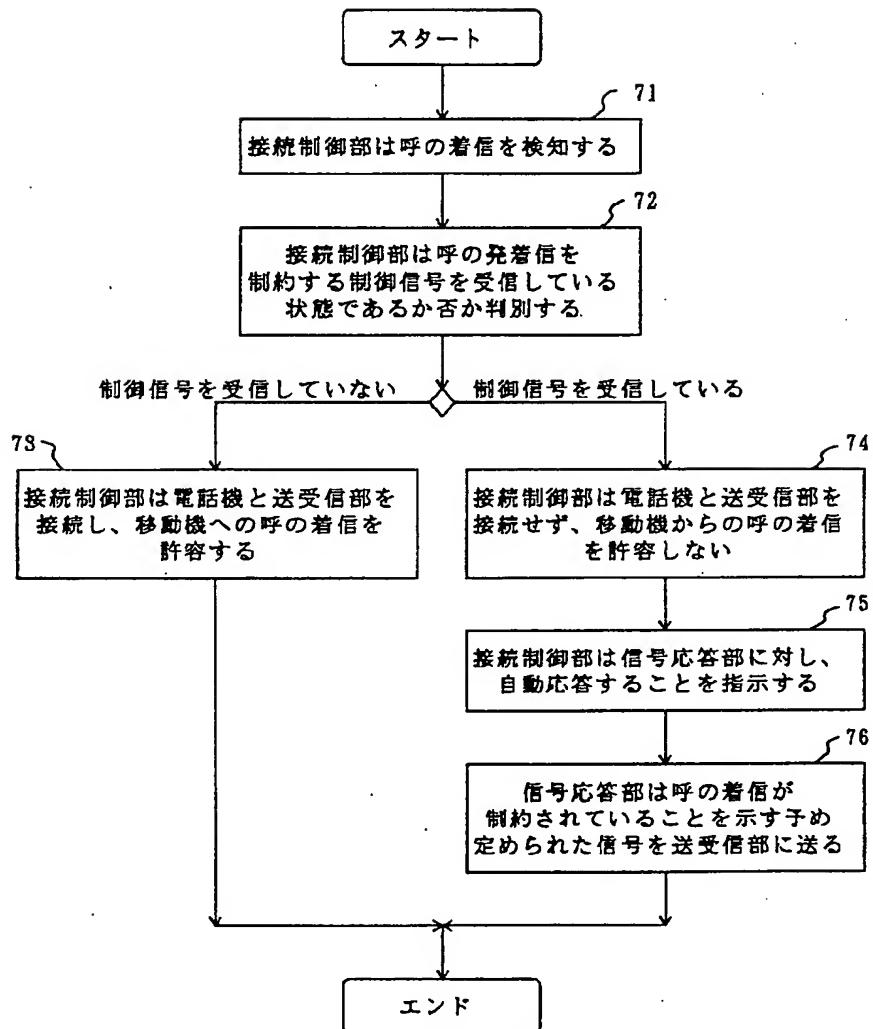
【図6】



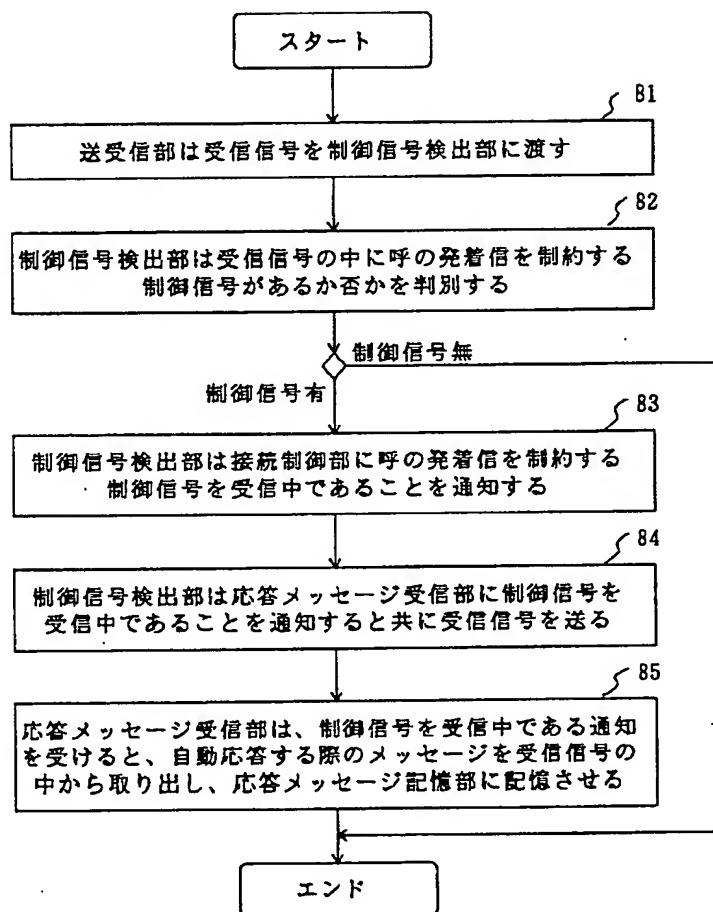
【図13】



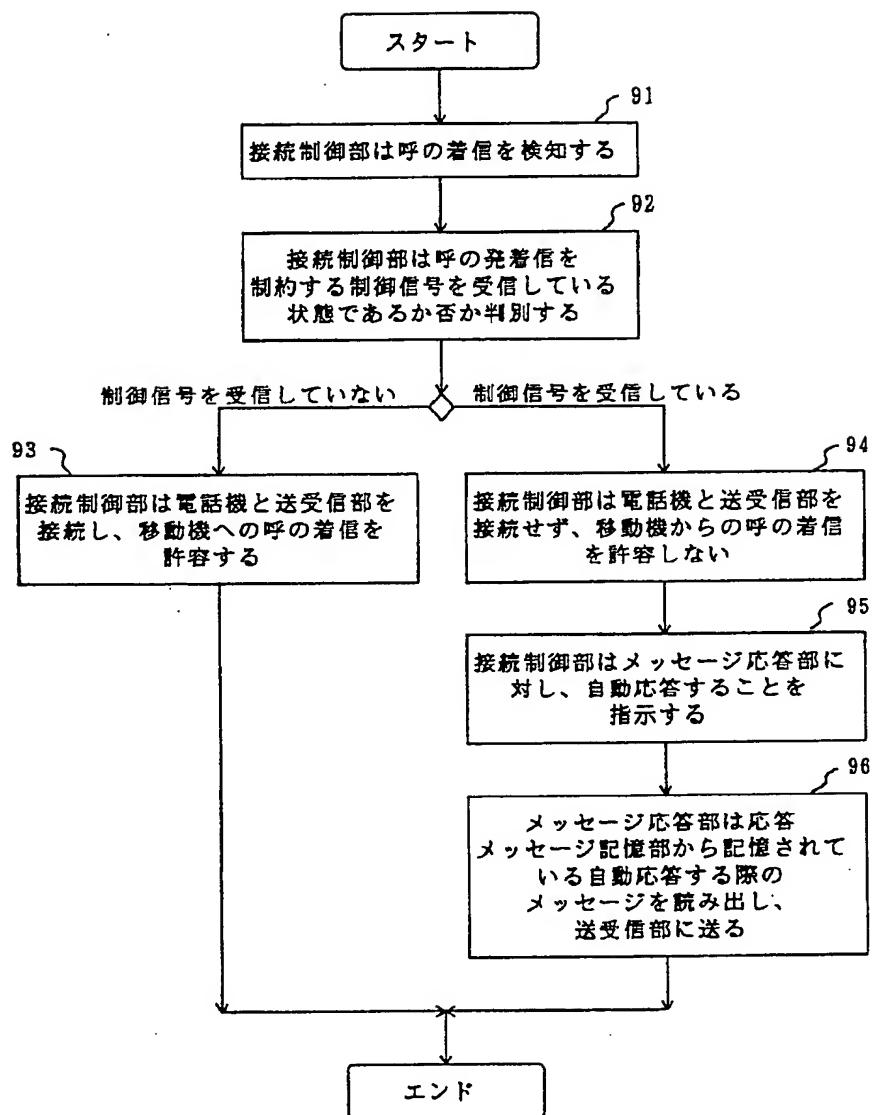
【図7】



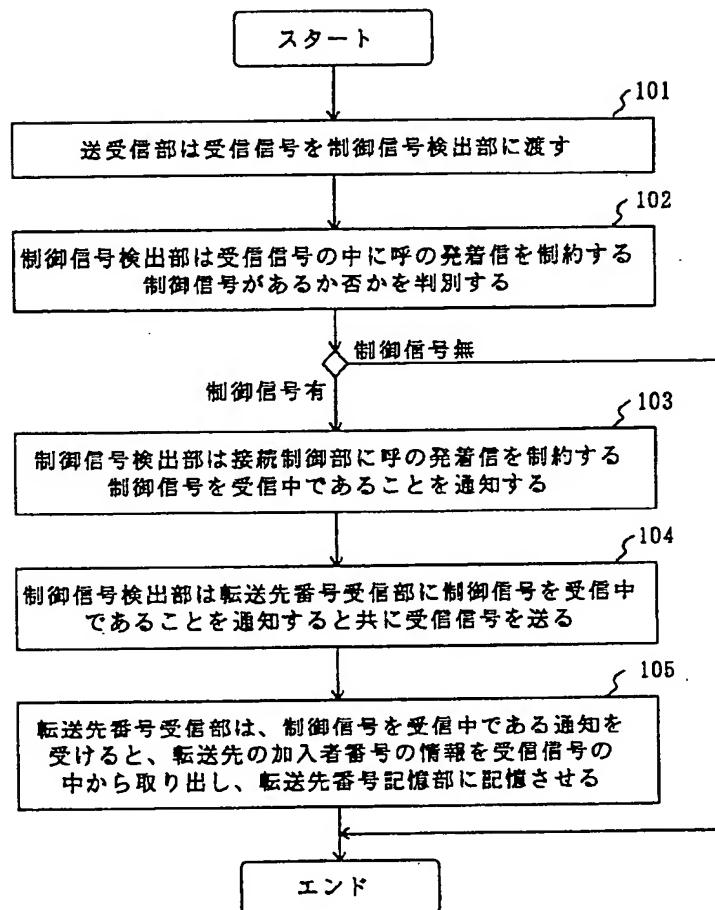
【図8】



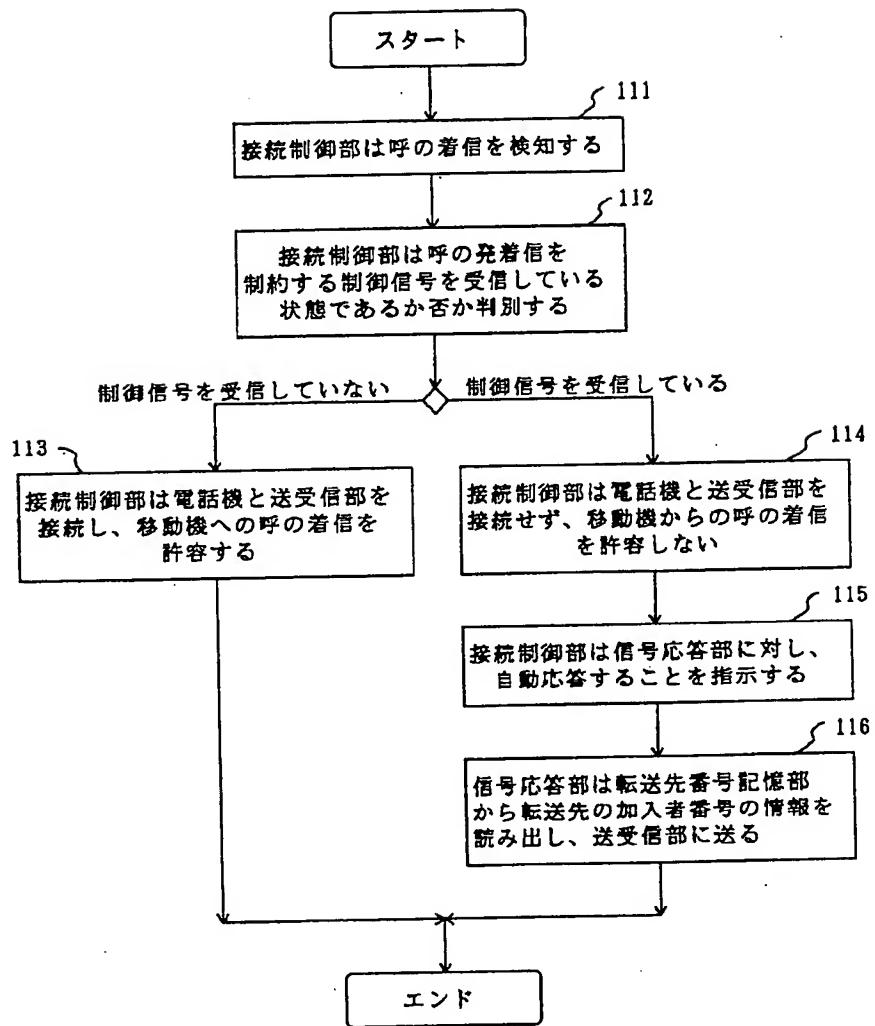
【図9】



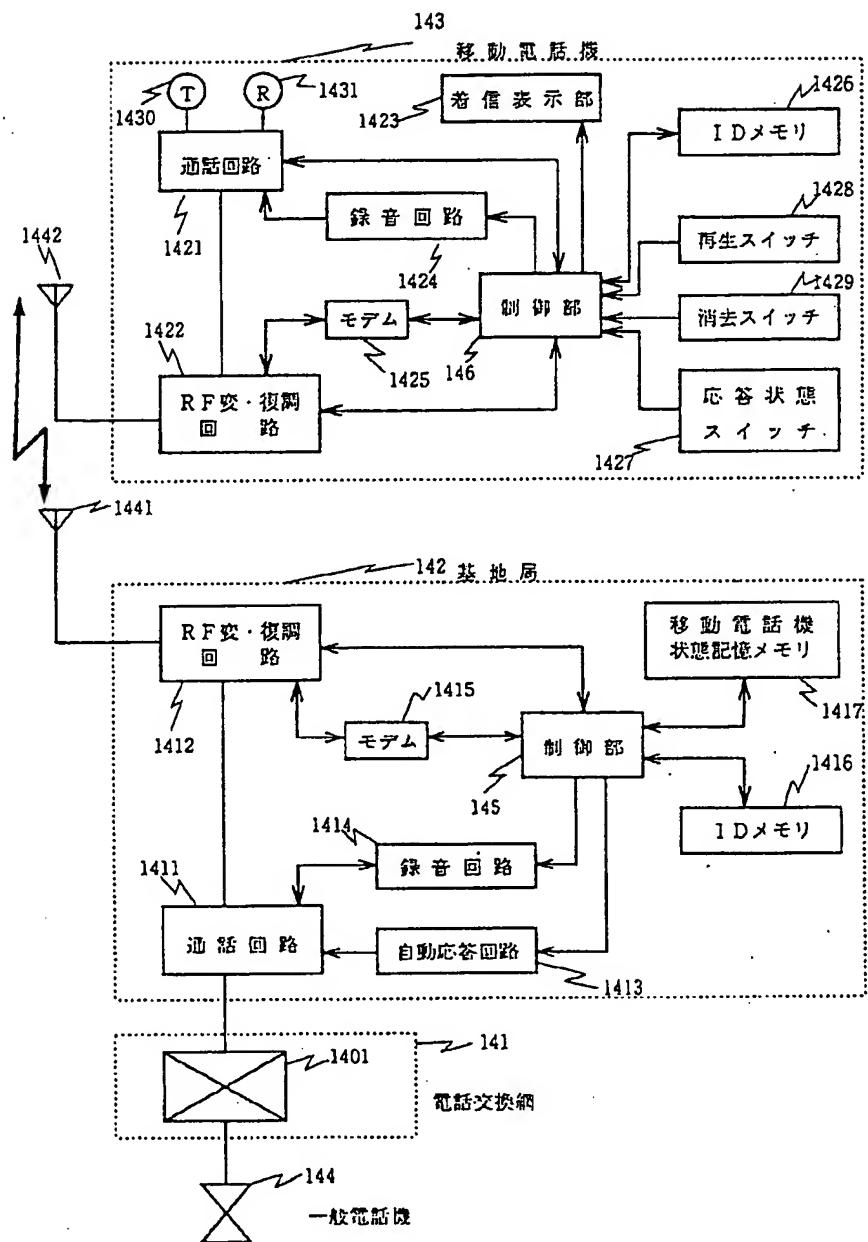
【図10】



【図11】



【図14】



フロントページの続き

(51) Int.Cl.6

識別記号

F I
H 0 4 B 7/26

1 0 9 T

Japanese Patent Application Laid-Open No. 10-108265

(54) [TITLE OF THE INVENTION] MOBILE COMMUNICATION SYSTEM

(57) [ABSTRACT]

[PROBLEMS] To provide means that limits, by a person other than a mobile-device user, the transmission/reception of a call from/by the mobile device and also to inform the call reception user that the reception of a call is being limited and, in a case where reception of a call has occurred on the mobile device, make automatic response with respect to that call and thereby make compensation for the failure to directly receive that call.

[SOLVING MEANS] In a regional zone or building where it is wanted that the transmission/reception of a call from/by a mobile device be limited, there is installed a call transmission/reception limiting apparatus that, together with a control signal that indicates limiting the transmission/reception of a call, transmits a response message or transfer destination number information. The mobile device receives the signal. The mobile device detects from that signal the control signal. When kept receiving the control signal, with respect to a request to transmit a call from the mobile device or reception of a call with respect thereto, the mobile device avoids connection of that request or that received call. The mobile device, simultaneously, displays, on a message display device or a lamp or an LED, that it is kept receiving the control signal. When, during the reception of the control signal, reception of a call has occurred, the mobile device makes automatic response to the effect that the reception of

a call is being limited. When making automatic response, the mobile device makes automatic response of a response message that it has received together with the control signal. Or, in addition to this means, there is also means that automatically responds with the transfer destination number that the mobile device has received together with the control signal.

[WHAT IS CLAIMED IS]

[Claim 1] A mobile communication system characterized in that, under a circumstance where, within a regional zone that controls the transmission/reception of a call from/by a mobile portable telephone terminal, this mobile portable telephone terminal exists, there is disposed means that transmits with respect to the mobile portable telephone terminal a control signal for limiting the transmission/reception of a call from/by the telephone terminal; in the mobile portable telephone terminal, when it has received the control signal, the transmission/reception of a call from/by it is limited and, simultaneously, that effect is notified to a user who possesses the mobile portable telephone terminal, and, when the mobile portable telephone terminal has received a call, the mobile portable telephone terminal makes automatic response of a signal indicating that the reception of a call is being limited.

[Claim 2] A mobile communication system, the mobile communication system being adapted to use a proceeding with which connection, with respect to a mobile device, of a transmitted/received call from/by the mobile device is limited; and a replacing response with respect thereto is made,

characterized by including a transmission/reception limiting apparatus having control signal transmission means that transmits a control signal that indicates a command to limit the transmission/reception of a call, the mobile device including:

transmission/reception means that receives a signal, control signal detection means that detects from the received signal the control signal that limits the transmission/reception of a call,

connection control means that, in a case where having received from a telephone a command to transmit a call from the mobile device, or in a case where having received a call with respect to the mobile device, when the mobile device is kept receiving the control signal, avoids the connection of that call to the telephone,

means that, in a case where the mobile device is kept receiving the control signal, notifies to a call reception user that the transmission/reception of a call is being limited,

signal response means that, in a case where reception of a call has occurred on the mobile device, makes automatic response, according to the control of the connection control means, of a signal indicating that the reception of a call is being limited, and

a telephone.

[Claim 3] A mobile communication system according to claim 2, characterized in that the transmission/reception limiting apparatus includes:

transmission message storage means that stores therein a message that is used when automatic response is made of that the reception of a call is being limited, and

control signal transmission means that transmits the message and a control signal that indicates a command to limit the transmission/reception of a call; and the mobile device includes:

message reception means that receives a message that, when automatic response is made, is sent out,

reception message storage means that stores therein the response message that the message reception means has received, and

message response means that, in place of the signal response means, makes automatic response, according to the control of the connection control means, of the message that is stored in the message storage means.

[Claim 4] A mobile communication system according to claim 2, characterized in that the mobile device includes:

message register/deletion means that, in a case where reception of a call has occurred on the mobile device, registers or deletes a message with which automatic response is made,

message storage means that stores therein the message with which automatic response is made, and

message response means that, in place of the signal response means, makes automatic response, according to the control of the connection control means, of the message that is stored in the message storage means.

[Claim 5] A mobile communication system according to claim 2, characterized in that the transmission/reception limiting apparatus includes:

transfer destination number storage means that stores therein the subscriber number of a transfer destination, and

control signal transmission means that transmits the transfer destination number and a control signal that indicates limiting the transmission/reception of a call; and the mobile device includes:

transfer destination number reception means that receives the subscriber number of a transfer destination that is sent out when automatic response is made,

transfer destination number storage means that stores therein the subscriber number of the transfer destination that the mobile device has received,

the signal response means automatically responding, according to the control of the connection control means, with the subscriber number of the transfer destination that is stored in the transfer destination number storage means, and

an exchange including:

a transfer destination reception storage part that receives the transfer destination subscriber number,

call connection control means that controls the change in the connection of the call according to the transfer destination number, and

an exchange switch that performs switching of the call connection.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[TECHNICAL FIELD PERTINENT TO THE INVENTION] The present invention relates, in a mobile communication system, to a proceeding of limiting the connection of a transmitted/received call and making replacing response to that call and, more particularly, to a proceeding of, regardless of a mobile device user's will, performing control by a manager who manages a regional zone or building where the mobile device is situated.

[0002]

[PRIOR ART] As a conventional technique of performing reception control, in Japanese Patent Application Laid-Open No. Hei-2-67829 for example, there is proposed a proceeding that enables a person, who carries a portable wireless telephone terminal with him, to perform reception control with respect to his self's portable wireless telephone terminal and that, in a case where a call transmission side has declared its intention to the effect that its call is urgent, releases the reception limitation to thereby enable the reception of the call to thereby enhance the convenience of use of the portable telephone. That literature describes a proceeding wherein a call reception user instructs, from his mobile device, a relevant private branch exchange, to which the mobile device is connected, to make the reception limitation active/inactive, and also describes a proceeding that permits the connection of a call when that call is urgent.

[0003] On the other hand, as a conventional technique for making

a compensation with respect to the reception control that has been done, a transfer proceeding wherein transfer is performed under a circumstance where reception control is being done is disclosed in Japanese Patent Application Laid-Open No. Hei-4-347996 for example. Fig. 13 illustrates the construction of that transfer proceeding. In that construction, in a state where a received-call transfer function is being set active, there is selectively performed a changeover between a first reception control mode in which to cause a call, which has been received by a call reception user's mobile device, to be received by a transfer-destination's mobile device and a second reception control mode in which to cause a call, which has been received by a call reception user's mobile device, to be received directly by that mobile device itself. According to the reception mobile device user's own intention, a call that has been received during a conference is caused to be received by a user's assistant's mobile device while, on the other hand, during a free time, such as the rest time in the conference, that call is caused to be received by the user's own mobile device. That transfer proceeding provides such selective received-call transfer function.

[0004] Namely, in Fig. 13, an LCH 1300 is constructed of a BS interface part 1301, a control part 1302, a memory part 1303, and a PBX interface part 1304. The BS interface part 1301 is wire-connected to parent devices BS 1305 to 1307. The control part 1302 is constructed of a connection control part 1302A that performs connection between a child device PS and a PBX 1320

via the corresponding parent device BS and that also perform connection between the child devices PS that are situated in different parent-device BS zones, via the corresponding parent devices BS, and a memory control part 1302B that controls a memory part 1303. The memory part 1303 is constructed of a first area 1303A that stores therein correspondence of the child devices PS to corresponding dial-in numbers, a second area 1303B that stores therein which BS zone the respective PS is situated in, a third area 1303C that stores therein correspondence of the child device PS having set therein the received-call transfer mode to the child device PS that is the transfer destination and a transfer flag that indicates which mode the child device PS having set therein the received-call transfer mode is set with respect to, and a fourth area 1303D that stores therein the totaled counted value of received-calls that the LCU has transferred to the transfer destination child device PS.

[0005] The PBX interface part 1304 is connected to a PBX 1320. The PBX 1320 is connected to a general public net 1330. Also, within the zone Z1 of the parent device BS1305 there exist the child devices PS 1308 to 1310, within the zone Z2 of the parent device BS1306 there exist the child devices PS 1311 to 1312, and within the zone Z3 of the parent device BS 1307 there exist the child devices PS 1313 to 1314.

[0006] Also, as a conventional technique that regards the substitution response, in, for example, Japanese Patent Application Laid-Open No. Hei-4-216221, there is disclosed a

proceeding wherein a mobile device detects a relevant call reception user's operation status and automatically sends out a received-call response reservation signal; and a relevant wireless base station reserves the succeeding communications. In that official gazette, it is described that control of the substitution response is performed irrespective of the call reception user's intention.

[0007] Further, as another conventional technique that regards the substitution response, in, for example, Japanese Patent Application Laid-Open No. Hei-5-122757, there is disclosed a proceeding wherein, in a case a mobile device is kept unable to answer, the contents of the caller's communication are transmitted to the relevant base station. In Fig. 14, there is illustrated an example of that construction. Referring to Fig. 14, the base station is equipped with mobile device status storage means 1417 that stores therein the status of response of a mobile device itself, automatic response means 1413 that, in a case where the status of the mobile device itself stored in the mobile device status storage means 1417 disables responding with respect to a call from other than the mobile device, or in a case where it is impossible to construct a wireless communication path line between those mobile devices, makes automatic response, storage means 1414 that, after that automatic response, stores therein the information of the caller's communication, and transfer means 145 that, in a case where, after the end of the storage performed by the storage means, a wireless communication path line can be constructed

between the mobile devices, transfers the communication information that has been stored, to the mobile device. The mobile device is equipped with response notification means that notifies to the base station the status of response of the user's self's mobile device, transfer communication information storage means 1424 that stores therein the communication information that has been transferred from the transfer means, reception notification means that, when having finished storing the transfer communication information by the transfer communication information storage means, notifies the reception to the mobile device user, and outputting means that outputs the transfer communication information that has been stored.

[0008]

[PROBLEMS TO BE SOLVED BY THE INVENTION] The above-described conventional techniques have the points in problem that are described below.

[0009] (1) The first point in problem is that, in the conventional techniques, the reception of a call cannot be limited by a person other than a call reception user who carries the mobile device with him.

[0010] Conventionally, in the mobile communication system, there is adopted a method wherein a call reception mobile device, when a call has been received, informs the reception of a call with respect to a call reception user by ringing (ringing). When he does not want to receive that call, the call reception user turns off the power of the mobile device and can thereby

limit the reception of a call. However, in a case where, within a particular building such as a hotel, a restaurant, a hospital, etc., a manager of that building wants to limit the reception of a call, there were no means that could be taken with respect to that. Also, although there is a method wherein the reception of a call is informed to the mobile device carrying user by means of a vibration, even when, because a phone talk itself becomes troublesome to those others who are around that call reception user, it is preferable to limit the reception of a call, the manager had no means but to orally individually remind him of his withdrawing a phone talk. In the conventional techniques that are described in Japanese Patent Applications Laid-Open Nos. Hei-4-347996 and Hei-2-67829, the problem resides in that the reception of a call cannot be controlled by any other person's, than the call reception user's, intention.

[0011] The reason for this is that the relevant conventional technique gives attention to the enhancement in the convenience of use on the part of only a subscriber who utilizes the mobile communication system and is deficient in giving consideration to those who are around the user or to the environment in which the user is situated, failing to take countermeasure with respect thereto.

[0012] (2) The second point in problem is that, as in the case of the first point in problem, the transmission of a call from the mobile device cannot be limited by any other person than the mobile device carrying subscriber. For this reason, with respect to the problems with the errors in operation of the

medical equipment, for example, in a relevant hospital, there is no means but to rely on asking the user.

[0013] (3) The third point in problem is that no sufficient measures are taken in compensation for the limitation of a received call.

[0014] In a case where the reception of a call has been limited regardless of the call reception user's intention, no means is provided that enables the call reception user to confirm that the reception of a call is being limited. In the conventional technique described in the above-described Japanese Patent Application Laid-Open No. Hei-4-216221, from a relevant wireless base station, a notification is only given to a call transmitter with a voice, and, with regard to a received call that is made during a received-call response reservation, the call reception user is short of means with which he directly knows that received call. Also, according to the conventional technique described in the above-described Japanese Patent Application Laid-Open No. Hei-5-122757, the call reception user can confirm including the communicated contents at the point in time when response has become possible with the storage means in the base station. However, no compensation means for a received call that is urgent exists.

[0015] The reason for this is considered to reside in that the way of thinking a compensation for the limitation of a received call was not sufficient.

[0016] (4) The fourth point in problem is that there is adopted the proceeding wherein the basic control is performed within

the exchange or wireless base station. Especially, in the conventional technique described in the above-described Japanese Patent Application Laid-Open No. Hei-4-347996, it is premised that the mobile devices including transfer destination mobile devices be connected to the same exchange. For this reason, a problem exists with providing the function that should work when a communication is done through the intermediary of a plurality of exchanges or wireless base stations.

[0017] The reason for this is that the conventional technique puts importance upon mitigating the load that is applied when the mobile device performs processing so as to decrease the cost and weight of the mobile device.

[0018] Accordingly, the present invention has been made in view of the above-described points in problem and an object of the invention is to provide a mobile communication system that, without relying on the mobile device carrying call reception user's intention, enables a manager, other than the call reception user, who manages a particular or building to limit the transmission/reception of a call from/by the mobile device.

[0019] Another object of the present invention is to provide a mobile communication system that is equipped with means that notifies the call reception user that the transmission/reception of a call are being limited, means that makes substitution response with respect to a call that has come on the mobile device, and compensation means that gives a compensation for the fact that the direct reception of a call by the mobile device is being limited.

[0020] Still another object of the present invention is to provide a mobile communication system that enables the basic control to be done in the regional zone or building that performs the regulation of the transmission and reception as well as in the mobile device.

[0021]

[MEANS FOR SOLVING THE PROBLEMS] To attain the above object, a mobile communication system according to the present invention, the mobile communication system being adapted to use a proceeding with which connection, with respect to a mobile device, of a transmitted/received call from/by the mobile device is limited; and a replacing response with respect thereto is made, is characterized by including a transmission/reception limiting apparatus having control signal transmission means that transmits a control signal that indicates a command to limit the transmission/reception of a call, and the mobile device including transmission/reception means that receives a signal, control signal detection means that detects from the received signal the control signal that limits the transmission/reception of a call, connection control means that, in a case where having received from a telephone a command to transmit a call from the mobile device, or in a case where having received a call with respect to the mobile device, when the mobile device is kept receiving the control signal, avoids the connection of that call to the telephone, means that includes a message display device or a lamp or an LED and that, in a case where the mobile device is kept receiving the control signal,

notifies a call reception user that the transmission/reception of a call is being limited, signal response means that, in a case where reception of a call has occurred on the mobile device, makes automatic response, according to the control of the connection control means, of a signal indicating that the reception of a call is being limited, and a telephone.

[0022] The present invention is characterized in that the transmission/reception limiting apparatus includes transmission message storage means that stores therein a message that is used when automatic response is made of that the reception of a call is being limited, and control signal transmission means that transmits the message and a control signal that indicates a command to limit the transmission/reception of a call; and the mobile device includes; and the mobile device includes message reception means that receives a message that, when automatic response is made, is sent out, reception message storage means that stores therein the response message that the message reception means has received, and message response means that, in place of the signal response means, makes automatic response, according to the control of the connection control means, of the message that is stored in the message storage means.

[0023] Also, the present invention is characterized in that the mobile device includes message register/deletion means that, in a case where reception of a call has occurred on the mobile device, registers or deletes a message with which automatic response is made, message storage means that stores therein the

message with which automatic response is made, and message response means that, in place of the signal response means, makes automatic response, according to the control of the connection control means, of the message that is stored in the message storage means.

[0024] Further, the present invention is characterized in that the transmission/reception limiting apparatus includes transfer destination number storage means that stores therein the subscriber number of a transfer destination, and control signal transmission means that transmits the transfer destination number and a control signal that indicates limiting the transmission/reception of a call; and the mobile device includes transfer destination number reception means that receives the subscriber number of a transfer destination that is sent out when automatic response is made, transfer destination number storage means that stores therein the subscriber number of the transfer destination that the mobile device has received, the signal response means being equipped with signal response means that automatically responding, according to the control of the connection control means, with the subscriber number of the transfer destination that is stored in the transfer destination number storage means, and an exchange including a transfer destination number reception storage part that receives the transfer destination subscriber number, call connection control means that controls the change in the connection of the call according to the transfer destination number, and an exchange switch that performs

connection/switching of the call.

[0025]

[EMBODIMENTS OF THE INVENTION] An embodiment of the present invention will hereafter be explained. The present invention, in its preferred embodiment, is equipped with a call transmission/reception limiting apparatus (11 of Fig. 1) having a control signal transmission part that transmits a control signal that instructs limiting transmission/reception of a call. A mobile device (12 of Fig. 1) is constructed of a transmission/reception part (121 of Fig. 1) that receives a signal, a control signal detection part (122 of Fig. 1) that detects a control signal that limits the transmission/reception from within the received signal, a connection control part (123 of Fig. 1) that, in a case where having received a command to transmit from the mobile device through the operation of a telephone (127 of Fig. 1) or in a case where having received a reception call with respect to the mobile device (12 of Fig. 1), during a time period in which the connection control part is kept in reception of the control signal, avoids connection thereof to the telephone (127 of Fig. 1), means (125 and 126 of Fig. 1) that, in a case where kept in reception of the control signal, notifies to the call reception user that the transmission/reception of a call is kept in limitation, a signal response part (124 of Fig. 1) that, in a case where having received a reception call with respect to the mobile device, makes automatic response of a signal indicating that the reception of a call is kept in limitation according to the

control from the connection control part (123 of Fig. 1), and the telephone (127 of Fig. 1).

[0026] In a case where he wants to limit a phone talk that is made through the use of the mobile device in a hotel, restaurant, hospital, etc., a manager who manages such facility installs one or more in number the transmission/reception limiting apparatuses (11 of Fig. 1) that transmits a control signal for instructing limiting the transmission from the mobile device and the reception with respect to the mobile device, so that the mobile device may receive that control signal.

[0027] When a call reception user, carrying the mobile device with him, enters a regional zone or a building, where the connection for transmission/reception of a call is limited, the mobile device (12 of Fig. 1) receives, by its transmission/reception part, a control signal that is transmitted from the transmission/reception limiting apparatus (11 of Fig. 1) that is installed one or more in number in that regional zone or building and that indicates limiting the transmission/reception of a call.

[0028] In the control signal detection part (122 of Fig. 1), it detects the above-described control signal from within the signal that has been received by the transmission/reception signal and notifies to the connection control part (123 of Fig. 1) that its self's mobile device is kept in reception of that control signal.

[0029] In a state where it is notified that the self's mobile device is kept in reception of the control signal, the

connection control part (123 of Fig. 1) displays with respect to a message display device (125 of Fig. 1) of the mobile device a message that notifies that the transmission/reception of a call is kept in limitation, or lights up a lamp or LED (126 of Fig. 1) and thereby notifies to the call reception user that the transmission/reception of a call is kept in limitation.

[0030] When, in a case where the connection control part (123 of Fig. 1) is kept notified that its self's mobile device is kept in reception of the control signal, reception of a call occurs, the connection control part avoids the connection of that call with respect to the telephone (127 of Fig. 1) to thereby limit the reception of the call.

[0031] Further, the connection control part (123 of Fig. 1) sends a command to the signal response part (124 of Fig. 1) and the signal response part (124 of Fig. 1) makes automatic response of a signal that indicates that the reception of a call is kept limited and that is determined beforehand.

[0032] When, in a case where the connection control part (123 of Fig. 1) is kept notified that its self's mobile device is kept in reception of the control signal, it has received a command to transmit a call from the telephone (127 of Fig. 1), it avoids connection of that call to the transmission/reception part (121 of Fig. 1) to thereby limit the transmission of that call.

[0033] Next, the present invention, in its preferred second embodiment, is equipped with a transmission/reception limiting apparatus (21 of Fig. 2) that transmits a signal for controlling

the transmission/reception of the mobile device. The transmission/reception limiting apparatus (21 of Fig. 2) has a transmission message storage part (212 of Fig. 2) that stores therein a message that is used when making automatic response to the effect that the reception of a call is kept limited. It thereby transmits a control signal indicating that the reception of a call is limited and also transmits, together therewith, a message that is stored in the transmission message storage part (212 of Fig. 2) and that is used when making automatic response, from a control signal transmission part (211 of Fig. 2).

[0034] A mobile device (22 of Fig. 2) receives, by its transmission/reception part (221 of Fig. 2), the message that is used when making automatic response, together with the control signal. A response message reception part (226 of Fig. 2) takes out from the reception signal the message that is used when making automatic response and stores it into a response message storage part (225 of Fig. 2). A connection control part (223 of Fig. 2), when reception of a call has occurred in the state of its being kept notified that its self's mobile device is kept in reception of the control signal, avoids the connection of that call to a telephone (227 of Fig. 2) and, simultaneously, sends a command to make automatic response with respect to a message response part (224 of Fig. 2).

[0035] Upon receipt of a command to make automatic response that has been sent from the connection control part (223 of Fig. 2), the message response part (224 of Fig. 2) reads out from a

response message storage part (225 of Fig. 2) the message that is stored therein and that is used when making automatic response, and transmits it by way of the transmission/reception part (221 of Fig. 2).

[0036] Also, in the present invention, in its preferred third embodiment, a mobile device (32 of Fig. 3) is equipped with a message register/deletion part (326 of Fig. 2) that serves as means that registers or deletes a message for automatic response that is made when reception of a call has occurred on that mobile device (32 of Fig. 3). Thereby, the call reception user can designate on his own part a message that is stored in a message storage part (325 of Fig. 3) and that is used when making automatic response of that the reception of a call is being limited.

[0037] Also, the present invention, in its preferred fourth embodiment, is equipped with a transmission/reception limiting apparatus (41 of Fig. 4). The transmission/reception limiting apparatus (41 of Fig. 4) has a transfer destination number storage part (412 of Fig. 4) that stores therein the subscriber number of a transfer destination. It thereby transmits, together with a control signal that limits the transmission/reception of a call, information of the transfer destination number that is stored in the transfer destination number storage part (412 of Fig. 4), from a control signal transmission part (411 of Fig. 4).

[0038] A mobile device (42 of Fig. 4) receives, by its transmission/reception part (421 of Fig. 4), information of the

transfer destination number, together with a control signal. A transfer destination number reception part (426 of Fig. 4) takes out information indicating the number of a transfer destination and stores it into a transfer destination number storage part (425 of Fig. 4).

[0039] Upon receipt of a command to make automatic response that has been sent from a connection control part (423 of Fig. 4), a signal response part (424 of Fig. 4) reads out information indicating the subscriber number of the transfer destination that is stored in the transfer destination number storage part (425 of Fig. 4), from that storage part, and transmits it by way of a transmission/reception part (421 of Fig. 4).

[0040] Upon receipt of that response signal, an exchange (43 of Fig. 4) stores the subscriber number of the transfer destination into a transfer destination number reception register (431 of Fig. 4). Next, a call connection control part (432 of Fig. 4) switches connection of the reception call to that transfer destination number.

[0041]

[EMBODIMENTS OF THE INVENTION] For explaining in more detail the above-described embodiments of the present invention, those embodiments will be explained in detail with reference to the drawings.

[0042]

[FIRST EMBODIMENT] Fig. 1 is a view illustrating the most basic construction of an embodiment of the present invention.

Referring to Fig. 1, the embodiment of the present invention

will hereafter be explained. The embodiment of the present invention is equipped with the call transmission/reception limiting apparatus 11 having the control signal transmission part 111 that transmits a control signal that instructs limiting transmission/reception of the mobile device. The mobile device 12 is constructed of the transmission/reception part 121 that receives a signal, the control signal detection part 122 that detects whether or not its self's mobile device is kept in reception of a control signal, the connection control part 123 that, in a case where having received a command to transmit a call from the mobile device or in a case where having received a reception call with respect to the mobile device, during a time period in which the connection control part is kept in reception of the control signal, avoids connection thereof to the telephone, the signal response part 124 that makes automatic response of a signal indicating that the reception of a call is kept in limitation according to the control from the connection control part 123, the message display device or lamp or LED 126 indicating that the transmission/reception of a call is being limited, and the telephone 127.

[0043] Next, the operation of the embodiment of the present invention will be explained in detail with reference to Fig. 1 and the flow charts of Figs. 5 to 7.

[0044] Initially, with reference to Fig. 5, the detection operation, in this embodiment, that detects that the transmission/reception of a call is kept limited will be explained.

[0045] When a call reception user, carrying the mobile device 12 with him, goes into a regional zone or a building where connection of a transmission/reception call is being limited, the mobile device 12 receives, by its transmission/reception part 121, a control signal that is transmitted from the control signal transmission part 111 of the transmission/reception limiting apparatus 11 installed within the regional zone or building and that indicates that the transmission/reception of a call is being limited (step 51).

[0046] The control signal detection part 122 determines (step 52) whether or not there exists within the signal that has been received by the transmission/reception part 121 a control signal that indicates that the transmission/reception of a call is being limited. In a case where having detected the control signal, the control signal detection part 122 notifies to the connection control part 123 that its self's mobile device is receiving that control signal (step 53).

[0047] In the state of its being notified that the control signal is being received, the connection control part 123 displays on the message display device 126 of the mobile device 12 a message which notifies that the transmission/reception of a call is being limited, or lights up the lamp or LED 126 and thereby notifies to the call reception user that the transmission/reception of a call is being limited (step 54).

[0048] Next, the operation that, in this embodiment, is performed when, in a case where the transmission/reception of a call is being limited, a request to transmit a call has been

received will be explained with reference to Fig. 6.

[0049] When having received a command to transmit a call from the telephone 127 (step 61), the connection control part 123 determines (step 62) whether or not it is in the state of its being notified that the self's mobile device is receiving the control signal for limiting the transmission/reception of a call.

[0050] In a case where the self's mobile device is not kept receiving that control signal, the connection control part 123 connects the telephone 127 and the transmission/reception part 121 and permits the transmission of a call from the mobile device 12 (step 63).

[0051] On the other hand, when the self's mobile device is kept receiving that control signal, the connection control part 123 does not connect the telephone 127 and the transmission/reception part 121 and does not permit the transmission of a call (step 64).

[0052] Next, the operation that, in the embodiment of the present invention, is performed when, in a case where the transmission/reception of a call is being limited, the reception of a call has occurred will be explained with reference to Fig. 7.

[0053] Upon detection of the reception of a call (step 71), the connection control part 123 determines (step 72) whether or not it is in the state of its being notified that the self's mobile device is kept receiving the control signal for limiting the transmission/reception of a call.

[0054] In a case where the self's mobile device is not kept receiving that control signal, the connection control part 123 connects the telephone 127 and the transmission/reception part 121 and permits the reception of a call from the mobile device 12 (step 73).

[0055] On the other hand, when the self's mobile device is kept receiving that control signal, the connection control part 123 does not connect the telephone 127 and the transmission/reception part 121 and does not permit the reception of a call (step 74).

[0056] Further, the connection control part 123 instructs making automatic response with respect to the signal response part 124 (step 75). The signal response part 124 transmits to the transmission/reception part a signal that indicates that the reception of a call is being limited and that is determined beforehand (step 76).

[0057]

[SECOND EMBODIMENT] A second embodiment of the present invention will now be explained with reference to Fig. 2.

[0058] Referring to Fig. 2, this embodiment is equipped with the transmission/reception limiting apparatus 21, which includes the transmission message storage part 212 that stores therein a message that is used when making automatic response of that the reception of a call is being limited and the control signal transmission part 211 that transmits a message stored in the transmission message storage part and a signal that indicates that the reception of a call by the mobile device is

being limited. The mobile device 22 is constructed of the transmission/reception part 221 that receives a signal, a control signal detection part 222 that detects whether or not its self's mobile device is kept receiving a control signal, the connection control part 223 that, in a case where having received a command to transmit a call from the mobile device or in a case where having received a reception call that is received by the mobile device, in the state of the control signal's being received, avoids the connection of that reception call to the telephone, the response message reception part 226 that receives the message that is sent out when automatic response is made, the response message storage part 225 that stores therein the response message that the response message reception part 226 has received, the message response part 224 that makes automatic response of the message stored in the response message storage part 225 according to the control of the connection control part 223, and the telephone 227.

[0059] Next, the operation that is performed in this embodiment will be explained in detail with reference to Fig. 2 and Figs. 8 to 9.

[0060] Initially, with reference to Fig. 8, an explanation will be given of the reception operation of, simultaneously with detecting that the transmission/reception of a call is being limited, receiving an automatic response message with which there is made a response to the effect that the reception of a call is being limited. In Fig. 8, steps 81 to 83 correspond

to the steps 51 to 53 and therefore the explanation concerned therewith will be omitted here.

[0061] After the execution of the step 83, the control signal detection part 222 notifies the response message reception part 226 that the mobile device is kept receiving the control signal and simultaneously transmits the reception signal to the response message reception part 226 (step 84).

[0061] Upon receipt of a notification of that the control signal is kept received from the control signal detection part 222, the response message reception part 226 takes out from within the reception signal an automatic response message for notifying that the reception of a call is being limited and stores it into the response message storage part (step 85).

[0063] Next, the operation that is performed when, in a case where the transmission/reception of a call is being limited, a call reception has occurred will be explained with reference to Fig. 9. In Fig. 9, steps 91 to 94 therein respectively correspond to the steps 71 to 74 of Fig. 7 and therefore the explanation concerned therewith is omitted.

[0064] After the step 94, the connection control part 223 instructs the message response part 224 to make automatic response (step 95), and the message response part 224 reads out from the response message storage part 225 a message for making automatic response that is stored therein and sends it to the transmission/reception part (step 96).

[0065] The operation that is performed when, in a case where the transmission/reception of a call is being limited, a request

to transmit a call has occurred is the same as that which is performed in the case of Fig. 6 in the above-described first embodiment of the present invention, and therefore the explanation concerned therewith will be omitted.

[0066]

[THIRD EMBODIMENT] A third embodiment of the present invention will be explained with reference to Fig. 3.

[0067] Referring to Fig. 3, this embodiment is equipped with a call transmission/reception limiting apparatus 31 having a control signal transmission part 311 that transmits a signal that instructs limiting the transmission/reception of the mobile device. The mobile device 32 is constructed of a transmission/reception part 321 that receives a signal, a control signal detection part 322 that detects whether or not its self's mobile device is kept receiving a control signal, a connection control part 323 that, in a case where having received a command to transmit a call from the mobile device, or in a case where having received a call with respect to the mobile device, when the mobile device is in the state of its receiving the control signal, avoids connection of that call to the telephone, the message register/deletion part 326 that registers or deletes a message with which automatic response is made when reception of a call has occurred on the mobile device, the message storage part 325 that stores therein a message for automatic response, a message response part 324 that makes automatic response of the message stored beforehand in the message storage part 325 according to the control of the

connection control part 325, and a telephone 327.

[0068] Regarding the operation of this embodiment, the detection operation of detecting that the transmission/reception of a call is being limited is the same as that in the case of Fig. 5 illustrating the operation of the first embodiment. The operation that is performed when, in a case where the transmission/reception of a call is being limited, a request to transmit a call has occurred is the same as that in the case of Fig. 6 in the first embodiment. Also, the operation that is performed when, in a case where the transmission/reception of a call is being limited, reception of a call has occurred is the same as that in the case of Fig. 9 in the above-described second embodiment. Therefore, those explanations concerned will be omitted here.

[0069]

[FOURTH EMBODIMENT 4] Next, a fourth embodiment of the present invention will be explained with reference to Fig. 4.

[0070] Referring to Fig. 4, this embodiment is equipped with the call transmission/reception limiting apparatus 41 that includes the transfer destination number storage part 412 that stores therein the subscriber number of a transfer destination and the control signal transmission part 411 that transmits the subscriber number stored in the transfer destination number storage part 412 and a signal that indicates that the transmission and reception of the mobile device is being limited. The mobile device 42 is equipped with the transmission/reception part 421 that receives a signal, a

control signal detection part 422 that detects whether or not its self's mobile device is kept receiving a control signal, the connection control part 423 that, in a case where having received a command to transmit a call from the mobile device, or in a case where having received a call with respect to the mobile device, when the mobile device is kept receiving that control signal, avoids connection of that call to the telephone, the transfer destination number reception part 426 that receives the subscriber number of a transfer destination that is sent out when automatic response is made, the transfer destination number storage part 425 that stores therein the subscriber number that the transfer destination number reception part 426 has received, the signal response part 424 that makes automatic response of the number stored in the transfer destination number storage part 425 according to the control of the connection control part 423, and the telephone 427. Further, the embodiment is equipped with an exchange 43 that includes the transfer destination number reception register 431 that receives the transfer destination subscriber number, the call connection control part 432 that controls change in the connection of a call according to the transfer destination number, and an exchange switch 433 that performs connection/switching of a call.

[0071] Next, a detailed explanation will be given of the embodiment of the present invention with reference to Fig. 4 and Figs. 10 to 12.

[0072] Initially, with reference to Fig. 10, an explanation will

be given of the operation of, simultaneously with detecting that the transmission/reception of a call is being limited, receiving transfer destination information that comes when the reception of a call is being limited. Incidentally, steps 101 to 103 of Fig. 10 respectively correspond to the steps 51 to 53 of Fig. 5 (refer to the explanation that is made in the above-described first embodiment). Therefore, the explanation concerned therewith will be omitted.

[0073] After the step 103, the control signal detection part 422 notifies to the transfer destination number reception part 426 that its self's mobile device is kept receiving the control signal and, simultaneously, sends the reception signal to the transfer destination number reception part 426 (step 104).

[0074] Upon receipt of a notification, from the control signal detection part 422, of that the mobile device is kept receiving that control signal, the transfer destination number reception part 426 takes out from the reception signal the information of the transfer destination number and stores it into the transfer destination storage part 425 (step 105).

[0075] Next, the operation that is performed, in the mobile device 42, when, in a case where the transmission/reception of a call is being limited, reception of a call has occurred will be explained with reference to Fig. 11. Incidentally, steps 111 to 114 of Fig. 11 respectively correspond to the steps 71 to 74 of Fig. 7 and therefore the explanation concerned therewith will be omitted.

[0076] After the step 114, the connection control part 423

instructs the signal response part 424 to make automatic response (step 115). Then the signal response part 424 reads out from the transfer destination number storage part 425 the information of the transfer destination number that is stored therein, and sends it to the transmission/reception part (step 116).

[0077] Next, the operation that, when, in case where the transmission/reception of a call is being limited, reception of a call has occurred, is performed, in the exchange 43, after the automatic response in the mobile device 42, will be explained with reference to Fig. 12.

[0078] Upon receipt of a response signal, from the mobile device 42, that notifies that the reception of a call is being limited, the exchange 43 takes out from that response signal the information indicating the transfer number and stores it into the transfer destination number reception register 431 (step 121).

[0079] The connection-of-call control part 432 reads out the information of the transfer destination number stored in the transfer destination number reception register 131. And it controls (step 122) the exchange switch 433 so that it may switch the connection of the transmitted call according to the information of the transfer destination number. The exchange switch 433 switches (step 123) the connection of that transmitted call according to the control of the connection-of-call control part 422.

[0080] The operation that is performed when, in a case where

the transmission/reception of a call is being limited, a request to transmit a call has occurred is the same as that in the case of Fig. 6 in the first embodiment of the present invention, so the explanation concerned therewith is omitted here.

[0081]

[Effect of the Invention] As has been explained above, according to the present invention, the effects that are described below are brought about.

[0082] (1) The first effect of the present invention is that a manager of a particular regional zone or building other than the call reception user can limit the transmission of a call from the mobile device and the reception of it with respect to the mobile device without depending upon the mobile device carrying call reception user' will. As a result of this, the advantage arises that the manager has maintain an environment where no troublesomeness occurs over other users.

[0083] This is because, in the present invention, the mobile device receives a control signal that is transmitted from a call transmission/reception limiting apparatus installed by the manager who manages such regional zone or building, and, during the reception of that control signal, the transmission of a call from the mobile device and the reception of a call by the mobile device are limited.

[0084] (2) The second effect of the present invention is that the fact that the transmission of a call from the mobile device and the reception of a call with respect to the mobile device is being limited can be confirmed by the call reception user

who carries the mobile device with him.

[0085] The reason for this is that, in the present invention, during the reception of the control signal, the mobile device displays with respect to the message display device a message that indicates that the limitation is being active, or lights up or lights out the lamp or LED that is determined beforehand, thereby it has been arranged that the call reception user can confirm that the transmission and reception are being limited.

[0086] (3) The third effect of the present invention is that, in a case where the reception of a call with respect to the mobile device is being limited, means for making a replacing response to the received call is prepared, which enables, even with respect to urgent reception, ensuring compensation means for the call reception user.

[0087] This is because, in the present invention, in a case where under the circumstance where the reception of a call with respect to the mobile device is being limited reception of a call has occurred, the invention is equipped not only with means that responds thereto to the effect that the limitation is being active but also with means that responds thereto with a replacing telephone number by means of a voice or signal information. Further, in the present invention, regarding that replacing response telephone number, there is prepared means that enables the call reception user himself to designate that telephone number. Or, that is also because the invention has been constructed in the way in which the mobile device receives, together with the control signal, and stores therein,

the replacing telephone number of the front desk of a hotel, cashier of a restaurant, etc. that the manager of that regional zone or building determined beforehand.

[0088] (4) The fourth effect of the present invention is that the control according to the present invention can be made active on a regional zone, as well, that a plurality of exchanges can govern.

[0089] This is because, in the present invention, the basic control can be realized by the mobile device and the call transmission/reception limiting apparatus, only, that is installed in the regional zone or building where transmission or reception is regulated.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Fig. 1] Fig. 1 is a block diagram illustrating the most basic construction of a first embodiment of the present invention.

[Fig. 2] Fig. 2 is a block diagram illustrating the construction of a second embodiment of the present invention.

[Fig. 3] Fig. 3 is a block diagram illustrating the construction of a third embodiment of the present invention.

[Fig. 4] Fig. 4 is a block diagram illustrating the construction of a fourth embodiment of the present invention.

[Fig. 5] Fig. 5 is a flow chart illustrating the detection operation, in the first embodiment of the present invention, of detecting that the transmission/reception of a call is being limited.

[Fig. 6] Fig. 6 is a flow chart illustrating the operation that is performed when, in a case where the transmission/reception

of a call is being limited in the first embodiment of the present invention, a request to transmit a call has occurred.

[Fig. 7] Fig. 7 is a flow chart illustrating the operation that is performed when, in case where the transmission/reception of a call is being limited in the first embodiment of the present invention, reception of a call has occurred.

[Fig. 8] Fig. 8 is a flow chart illustrating the operation, in the second embodiment of the present invention, of, simultaneously with detecting that the transmission/reception of a call is being limited, responding to the effect that the reception of a call is being limited.

[Fig. 9] Fig. 9 is a flow chart illustrating the operation that, in the second embodiment of the present invention, is performed when, in a case where the transmission/reception of a call is being limited, reception of a call has occurred.

[Fig. 10] Fig. 10 is a flow chart illustrating the operation of receiving transfer destination information that, in the fourth embodiment of the present invention, is performed when, simultaneously with detecting that the transmission/reception of a call is being limited, the reception of a call is being limited.

[Fig. 11] Fig. 11 is a flow chart illustrating the operation that, in the fourth embodiment of the present invention, is performed when, in case where the transmission/reception of a call is being limited, reception of a call has occurred.

[Fig. 12] Fig. 12 is a flow chart illustrating the operation that, in the fourth embodiment of the present invention, is

performed, in the exchange, after, in a case where the transmission/reception of a call is being limited, an automatic response has been made from the mobile device.

[Fig. 13] Fig. 13 is a block diagram illustrating an example of the construction of a conventional mobile communication system.

[Fig. 14] Fig. 14 is a block diagram illustrating another example of the construction of the conventional mobile communication system.

[DESCRIPTION OF THE SYMBOLS]

Z1 to Z3 zone

11 call transmission/reception limiting apparatus

12 mobile device

21 call transmission/reception limiting apparatus

22 mobile device

31 call transmission/reception limiting apparatus

32 mobile device

41 call transmission/reception limiting apparatus

42 mobile device

43 exchange

111 control signal transmission part

121 transmission/reception part

122 control signal detection part

123 connection control part

124 signal response part

125 message display device

126 lamp/LED

127 telephone
141 telephone exchange net
142 base station
143 mobile telephone
144 general-type telephone
145, 146 control part
211 control signal transmission part
212 transmission message storage part
221 transmission/reception part
222 control signal detection part
223 connection control part
224 message response part
225 response message storage part
226 response message reception part
227 telephone
311 control signal transmission part
321 transmission/reception part
322 control signal detection part
323 connection control part
324 message response part
325 message storage part
326 message register/deletion part
327 telephone
411 control signal transmission part
412 transfer destination phone storage part
421 transmission/reception part
422 control signal detection part

423 connection control part
424 signal response part
425 transfer destination number storage part
426 transfer destination number reception part
427 telephone
431 transfer destination number reception register
432 call connection control part
433 exchange switch
1301 BS interface part
1302 control part
1302A connection control part
1302B memory control part
1303 memory part
1303A first area
1303B second area
1303C third area
1303D fourth area
1304 PBX interface part
1305 to 1307 parent device
1308 to 1311 child device
1330 general public net
1411, 1421 phone talk line
1412, 1422 RF modulation/demodulation part
1413 automatic response circuit
1414, 1424 recording circuit
1415, 1425 modem
1416, 1426 ID memory

1417 mobile telephone status storage memory
1423 reception display part
1427 response status switch
1428 reproduction switch
1429 erasure switch
1430 telephone transmitter
1431 telephone receiver

[FIG. 1]

11 CALL TRANSMISSION/RECEPTION LIMITING APPARATUS
111 CONTROL SIGNAL TRANSMISSION PART
12 MOBILE DEVICE
121 TRANSMISSION/RECEPTION PART
122 CONTROL SIGNAL DETECTION PART
123 CONNECTION CONTROL PART
124 SIGNAL RESPONSE PART
125 MESSAGE DISPLAY DEVICE
126 LAMP/LED
127 TELEPHONE

[FIG. 2]

21 CALL TRANSMISSION/RECEPTION LIMITING APPARATUS
211 CONTROL SIGNAL TRANSMISSION PART
212 TRANSMISSION MESSAGE STORAGE PART
22 MOBILE DEVICE
221 TRANSMISSION/RECEPTION PART
222 CONTROL SIGNAL DETECTION PART
223 CONNECTION CONTROL PART
224 MESSAGE RESPONSE PART
225 RESPONSE MESSAGE STORAGE PART
226 RESPONSE MESSAGE RECEPTION PART
227 TELEPHONE

[FIG. 3]

31 CALL TRANSMISSION/RECEPTION LIMITING APPARATUS
311 CONTROL SIGNAL TRANSMISSION PART
32 MOBILE DEVICE

321 TRANSMISSION/RECEPTION PART
322 CONTROL SIGNAL DETECTION PART
323 CONNECTION CONTROL PART
324 MESSAGE RESPONSE PART
325 MESSAGE STORAGE PART
326 MESSAGE REGISTER/DELETION PART
327 TELEPHONE

[FIG. 4]

41 CALL TRANSMISSION/RECEPTION LIMITING APPARATUS
411 CONTROL SIGNAL TRANSMISSION PART
412 TRANSFER DESTINATION NUMBER STORAGE PART
42 MOBILE DEVICE
421 TRANSMISSION/RECEPTION PART
422 CONTROL SIGNAL DETECTION PART
423 CONNECTION CONTROL PART
424 SIGNAL RESPONSE PART
425 TRANSFER DESTINATION NUMBER STORAGE PART
426 TRANSFER DESTINATION NUMBER RECEPTION PART
427 TELEPHONE
43 EXCHANGE
431 TRANSFER DESTINATION NUMBER RECEPTION REGISTER
432 CALL CONNECTION CONTROL PART
433 EXCHANGE SWITCH

[FIG. 5]

- ① START
- ② END

③ THERE EXISTS CONTROL SIGNAL
④ THERE EXISTS NO CONTROL SIGNAL

51 TRANSMISSION/RECEPTION PART DELIVERS RECEPTION SIGNAL TO
CONTROL SIGNAL DETECTION PART

52 CONTROL SIGNAL detection PART DETERMINES WHETHER OR NOT
THERE IS IN RECEPTION SIGNAL CONTROL SIGNAL THAT LIMITS
TRANSMISSION/RECEPTION OF CALL

53 CONTROL SIGNAL DETECTION PART NOTIFIES TO CONNECTION
CONTROL PART THAT ITS SELF'S MOBILE DEVICE IS KEPT IN RECEPTION
OF CONTROL SIGNAL THAT LIMITS TRANSMISSION/RECEPTION OF CALL

54 CONNECTION CONTROL PART DISPLAYS ON MESSAGE DISPLAY
DEVICE OF MOBILE DEVICE MESSAGE INDICATING THAT
TRANSMISSION/RECEPTION OF CALL IS BEING LIMITED, OR NOTIFIES
CALL RECEPTION USER CARRYING MOBILE DEVICE WITH HIM, BY LIGHTING
UP LAMP OR LED, THAT TRANSMISSION/RECEPTION OF CALL IS BEING
LIMITED

[FIG. 6]

- ① START
- ② END
- ⑤ IN RECEPTION OF CONTROL SIGNAL
- ⑥ NOT IN RECEPTION OF CONTROL SIGNAL

61 CONNECTION CONTROL PART RECEIVES REQUEST TO TRANSMIT A
CALL FROM TELEPHONE

62 CONNECTION CONTROL PART DETERMINES WHETHER OR NOT SELF'S
MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL THAT LIMITS
TRANSMISSION/RECEPTION OF CALL

63 CONNECTION CONTROL PART CONNECTS TELEPHONE AND
TRANSMISSION/RECEPTION PART AND PERMITS TRANSMISSION OF CALL
FROM MOBILE DEVICE

64 CONNECTION CONTROL PART DOES NOT CONNECT TELEPHONE AND
TRANSMISSION/RECEPTION PART AND DOES NOT PERMIT TRANSMISSION
OF CALL FROM MOBILE DEVICE

[FIG. 7]

① START

② END

⑤ IN RECEPTION OF CONTROL SIGNAL

⑥ NOT IN RECEPTION OF CONTROL SIGNAL

71 CONNECTION CONTROL PART DETECTS RECEPTION OF CALL

72 CONNECTION CONTROL PART DETERMINES WHETHER OR NOT SELF'S
MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL THAT LIMITS
TRANSMISSION/RECEPTION OF CALL

73 CONNECTION CONTROL PART CONNECTS TELEPHONE AND
TRANSMISSION/RECEPTION PART AND PERMITS RECEPTION OF CALL BY
MOBILE DEVICE

74 CONNECTION CONTROL PART DOES NOT CONNECT TELEPHONE AND
TRANSMISSION/RECEPTION PART AND DOES NOT PERMIT RECEPTION OF
CALL BY MOBILE DEVICE

75 CONNECTION CONTROL PART INSTRUCTS SIGNAL RESPONSE PART
TO MAKE AUTOMATIC RESPONSE

76 SIGNAL RESPONSE PART SENDS TO TRANSMISSION/RECEPTION

PART SIGNAL DETERMINED BEFOREHAND THAT INDICATES THAT RECEPTION OF CALL IS LIMITED

[FIG. 8]

- ① START
- ② END
- ③ THERE EXISTS CONTROL SIGNAL
- ④ THERE EXISTS NO CONTROL SIGNAL

81 TRANSMISSION/RECEPTION PART DELIVERS RECEPTION SIGNAL TO CONTROL SIGNAL DETECTION PART

82 CONTROL SIGNAL DETECTION PART DETERMINES WHETHER OR NOT THERE IS IN RECEPTION SIGNAL CONTROL SIGNAL THAT LIMITS TRANSMISSION/RECEPTION OF CALL

83 CONTROL SIGNAL DETECTION PART NOTIFIES TO CONNECTION CONTROL PART THAT ITS SELF'S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL THAT LIMITS TRANSMISSION/RECEPTION OF CALL

84 CONTROL SIGNAL DETECTION PART NOTIFIES TO RESPONSE MESSAGE RECEPTION PART THAT ITS SELF'S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL AND SENDS RECEPTION SIGNAL TO IT

85 UPON RECEIPT OF NOTIFICATION OF THAT SELF'S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL, RESPONSE MESSAGE RECEPTION PART TAKES OUT FROM WITHIN RECEPTION SIGNAL MESSAGE THAT IS USED WHEN MAKING AUTOMATIC RESPONSE AND STORES IT INTO RESPONSE MESSAGE STORAGE PART

[FIG. 9]

① START
② END
⑤ IN RECEPTION OF CONTROL SIGNAL
⑥ NOT IN RECEPTION OF CONTROL SIGNAL
91 CONNECTION CONTROL PART DETECTS RECEPTION OF CALL
92 CONNECTION CONTROL PART DETERMINES WHETHER OR NOT SELF'S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL THAT LIMITS TRANSMISSION/RECEPTION OF CALL
93 CONNECTION CONTROL PART CONNECTS TELEPHONE AND TRANSMISSION/RECEPTION PART AND PERMITS RECEPTION OF CALL BY MOBILE DEVICE
94 CONNECTION CONTROL PART DOES NOT CONNECT TELEPHONE AND TRANSMISSION/RECEPTION PART AND DOES NOT PERMIT RECEPTION OF CALL BY MOBILE DEVICE
95 CONNECTION CONTROL PART INSTRUCTS MESSAGE RESPONSE PART TO MAKE AUTOMATIC RESPONSE
96 MESSAGE RESPONSE PART READS OUT FROM RESPONSE MESSAGE STORAGE PART MESSAGE THAT IS USED WHEN MAKING AUTOMATIC RESPONSE AND SENDS IT TO TRANSMISSION/RECEPTION PART

[FIG. 10]

① START
② END
③ THERE EXISTS CONTROL SIGNAL
④ THERE EXISTS NO CONTROL SIGNAL
101 TRANSMISSION/RECEPTION PART DELIVERS RECEPTION SIGNAL TO CONTROL SIGNAL DETECTION PART

102 CONTROL SIGNAL DETECTION PART DETERMINES WHETHER OR NOT THERE IS IN RECEPTION SIGNAL CONTROL SIGNAL THAT LIMITS TRANSMISSION/RECEPTION OF CALL

103 CONTROL SIGNAL DETECTION PART NOTIFIES TO CONNECTION CONTROL PART THAT ITS SELF' S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL THAT LIMITS TRANSMISSION/RECEPTION OF CALL

104 CONTROL SIGNAL DETECTION PART NOTIFIES TO TRANSFER DESTINATION NUMBER RECEPTION PART THAT ITS SELF' S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL AND SENDS THERETO RECEPTION SIGNAL

105 UPON RECEIPT OF NOTIFICATION OF THAT SELF' S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL, TRANSFER DESTINATION NUMBER RECEPTION PART TAKES OUT FROM WITHIN RECEPTION SIGNAL INFORMATION OF SUBSCRIBER NUMBER OF TRANSFER DESTINATION AND STORES IT INTO TRANSFER DESTINATION NUMBER STORAGE PART

[FIG. 11]

- ① START
- ② END
- ⑤ IN RECEPTION OF CONTROL SIGNAL
- ⑥ NOT IN RECEPTION OF CONTROL SIGNAL

111 CONNECTION CONTROL PART DETECTS RECEPTION OF CALL
112 CONNECTION CONTROL PART DETERMINES WHETHER OR NOT ITS SELF' S MOBILE DEVICE IS KEPT IN RECEPTION OF CONTROL SIGNAL THAT LIMITS TRANSMISSION/RECEPTION OF CALL

113 CONNECTION CONTROL PART CONNECTS TELEPHONE AND TRANSMISSION/RECEPTION PART AND PERMITS RECEPTION OF CALL BY MOBILE DEVICE

114 CONNECTION CONTROL PART DOES NOT CONNECT TELEPHONE AND TRANSMISSION/RECEPTION PART AND DOES NOT PERMIT RECEPTION OF CALL BY MOBILE DEVICE

115 CONNECTION CONTROL PART INSTRUCTS SIGNAL RESPONSE PART TO MAKE AUTOMATIC RESPONSE

116 SIGNAL RESPONSE PART READS OUT FROM TRANSFER DESTINATION NUMBER STORAGE PART INFORMATION OF SUBSCRIBER NUMBER OF TRANSFER DESTINATION AND SENDS IT TO TRANSMISSION/RECEPTION PART

[FIG. 12]

① START

② END

121 UPON RECEIPT OF RESPONSE SIGNAL FROM MOBILE DEVICE, EXCHANGE TAKES OUT FROM IT INFORMATION OF TRANSFER DESTINATION NUMBER AND STORES THAT INFORMATION INTO TRANSFER DESTINATION NUMBER RECEPTION REGISTER

122 CALL CONNECTION CONTROL PART READS OUT INFORMATION INDICATING TRANSFER DESTINATION NUMBER, STORED IN TRANSFER DESTINATION NUMBER RECEPTION REGISTER, AND CONTROLS EXCHANGE SWITCH SO AS TO SWITCH CONNECTION OF TRANSMITTED CALL ACCORDING TO TRANSFER DESTINATION NUMBER INFORMATION

123 EXCHANGE SWITCH CHANGES OVER CONNECTION OF TRANSMITTED CALL ACCORDING TO CONTROL OF CALL CONNECTION CONTROL PART

[FIG. 13]

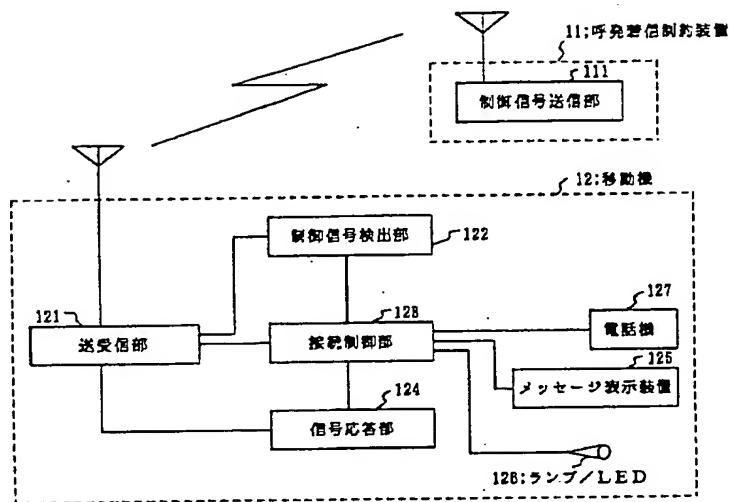
1301 BS INTERFACE PART
1302 CONTROL PART
1302A CONNECTION CONTROL PART
1302B MEMORY CONTROL PART
1303 MEMORY PART
1303A FIRST AREA
1303B SECOND AREA
1303C THIRD AREA
1303D FOURTH AREA
1304 PBX INTERFACE PART
1330 GENERAL PUBLIC NET

[FIG. 14]

143 MOBILE TELEPHONE
146 CONTROL PART
1421 PHONE TALK CIRCUIT
1422 RF MODULATION/DEMODULATION CIRCUIT
1423 RECEPTION DISPLAY PART
1424 RECORDING CIRCUIT
1425 MODEM
1426 ID MEMORY
1427 RESPONSE STATUS SWITCH
1428 REPRODUCTION SWITCH
1429 ERASURE SWITCH
141 TELEPHONE EXCHANGE NET
142 BASE STATION

144 GENERAL TELEPHONE
145 CONTROL PART
1411 PHONE TALK CIRCUIT
1412 RF MODULATION/DEMODULATION CIRCUIT
1413 AUTOMATIC RESPONSE CIRCUIT
1414 RECORDING CIRCUIT
1415 MODEM
1416 ID MEMORY
1417 MOBILE TELEPHONE STATUS STORAGE MEMORY

[図1]～Fig.1



[図2]～Fig.2

